



**DERO WATER AND SANITATION SECTOR ASSESSMENT
SEPTEMBER 2007**



An ACT/Caritas hand-pump; Taiba Camp; Zalingei

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3 ACRONYMS AND ABBREVIATIONS

ACF	Action Contre le Faim
ACT	Action by Churches Together
AMIS	African Mission in Sudan (the current AU peacekeeping force)
AU	African Union
CAFOD	Catholic Fund for Overseas Development
CBO	Community-based organisation
DERO	Darfur Emergency Response Operation
FAO	(UN) Food and Agriculture Organisation
FC	Field coordinator
GoS	Government of Sudan
HAC	Humanitarian Aid Commission (a GoS office to “assist” and monitor NGOs)
IDP	Internally Displaced Person
IMC	International Medical Corps
INGO	International NGO
IRC	International Rescue Committee
KAP	Knowledge, Attitudes and Practice
LWC	Locality Water Corporation (e.g. Zalingei Water Corporation)
MoH	Ministry of Health
MoU	Memorandum of understanding
MSF	Médecins sans Frontières
NGO	Non-governmental organisation
NCA	Norwegian Church Aid
NFI	Non-food items
NWC	National Water Corporation
PHAST	Participatory hygiene and sanitation transformation
PPP	Protection, Psychosocial and Peace-building work
SCC	Sudan Council of Churches
Sudanaid	Caritas Sudan
SUDO	Sudan Social Development Cooperation
SuP	Sudanese Pounds (4 SuP = 2 US Dollars = 1 British pound)
SWC	State Water Corporation (e.g. West Darfur State Water Corporation)
TEAR Fund	The Evangelical Alliance Relief Fund
ToR	Terms of Reference
UN	United Nations
UNEP	United Nations Environment Programme
UNICEF	United Nations Children’s Fund
UNAMID	United Nations Mission in Darfur (the proposed UN peacekeeping force)
WatSan	Water and sanitation (here taken to include issues of hygiene promotion, vector control, drainage and solid waste handling)
WES	Water and Environmental Sanitation Unit (a long-standing project supported by UNICEF and GoS)

4 EXECUTIVE SUMMARY AND RECOMMENDATIONS

Note: recommendations are shown in italics. A full list of recommendations, with associated timeframe, is provided in Chapter 11.

In response to the ongoing conflict in Darfur, the Darfur Emergency Response Operation (DERO) was formed in June 2004. Funded by over 60 agencies from the ACT and Caritas networks, DERO operates in South and West Darfur through four implementing partners: ACT/Caritas, SUDO, SCC and Sudanaid. DERO has completed a strategic planning process in September 2006 (DERO 2006a), the outcome of which was a mandate to restructure DERO into a support mechanism for national partners. The plan aims to increase SCC, SUDO and Sudanaid's organisational capacity so as to directly implement their own programs or to work directly with local partners, CBOs or government ministries. The plan aims to phase out all activities directly implemented by ACT/Caritas.

Neither SCC nor Sudanaid are active in the field of Water, Sanitation and Hygiene Promotion (WatSan) and they have thus not been considered candidates to "inherit" ACT/Caritas's WatSan activity. SUDO is the sole DERO partner, other than ACT/Caritas, with a substantial program in the WatSan sector. Given the strategic significance of the WatSan sector's development, the 2007 Appeal (DERO 2006b) committed DERO to undertaking an assessment of the WatSan Sector. This report is the result of the review.

The body of this report is made up of a commentary and analysis of the various key organisations in the WatSan sector, and of their activities in the South Darfur (Mershing), Garsila and Zalingei regions. Due to the lack of prior organisation of an itinerary or structure by ACT/Caritas and a general lack of time for the assessment, it has not proved possible to visit or meaningfully assess ACT/Caritas activities in Kubum, nor SUDO's activities in El Daein or other locations in South Nyala. The assessment of SUDO as an organisation is thus based on a rather limited basis and must be verified by other DERO staff with greater experience of SUDO's activities in other locations.

SUDO

SUDO was conceived as an advocacy and human rights NGO, whose mission statement is "to contribute to the creation of a general human rights movement, capable of defending itself and seeking a society free from all kinds of human rights violations" (DERO 2006a). SUDO's objective has created friction between SUDO and the Government of Sudan and its operations have been restricted or prohibited by HAC for greater or lesser periods in both Zalingei (especially 2006) and Garsila (2006-07). SUDO has, via DERO, become involved in the implementation of significant Health/Nutrition and WatSan programs in Darfur. Such activities require that the implementing organisation can guarantee a continuity of presence and service delivery and is able to communicate effectively with HAC.

- SUDO and its DERO partners should address the issue of whether a potentially confrontational advocacy and human rights agenda can realistically be combined with the continuous delivery of humanitarian relief. This issue will have bearing upon whether SUDO can be regarded as a potential implementer of ACT/Caritas's existing WatSan activity.

SUDO also has a stated ambition to achieve a wide geographical coverage of activities in Darfur: indeed it wishes to be "present in all areas of Sudan" by 2012. SUDO has a history of submitting ambitious budgets to DERO in order to pursue this objective, which have of necessity (limited donor resources) had to be cut during the finalisation of DERO appeals. According to SUDO, this "cutting" process has been undertaken with little consultation and has been presented as a *fait accompli*, leaving SUDO extremely frustrated and feeling that they are being treated as a less worthy partner in DERO.

SUDO have nevertheless tried to continue implementing an ambitious program of activity, but with resources spread ever more thinly. The result of this has been a gross underinvestment in infrastructure (computers, communications and vehicles – the organisation has only 4 vehicles in the whole of Darfur, while the Zalingei office has a single radio handset), and the payment of salaries at a level that is too

low to retain qualified staff. This assessment has revealed instances of two vaccinators working on a single vaccinator's salary (Mershing), and of a senior water engineer being paid as little as 900 SuP per month. The water engineer (who was responsible for SUDO's WatSan operation in Zalingei) has left, leaving SUDO's Zalingei office effectively without a WatSan capability. Preliminary enquiries at ACT/Caritas reveal that SUDO budgeted with a monthly salary of at least \$1000 (2000 SuP) for the water engineer, implying that a significant portion of the salary budget either disappeared as taxes and social insurances (is this possible?) or was used to support other aspects of SUDO's program.

- SUDO and DERO partners need to review SUDO's salary policy, especially regarding whether it is sufficient to motivate and retain qualified staff. In particular, the actual use of budgeted salary funds for water engineering staff should be investigated and accounted to DERO.

The imminent arrival of UNAMID will place further inflationary pressure on salaries and it will be increasingly important for all DERO partners to provide competitive remuneration to retain qualified staff – especially national staff.

Furthermore, there is a risk that SUDO's geographically ambitious work program in WatSan is being diluted to unacceptably low levels – water provision by SUDO in Um Gozen and Ton Qitr (Mershing camp) is significantly below SPHERE guidelines and requires immediate action to rectify the situation.

The consequence of the above-mentioned practices is that SUDO has a gross lack of infrastructural capacity and that its capacity in the WatSan sector is limited to Nyala and Ed Daein. Its personnel capacity is limited to one water engineer and one sanitation engineer, both based in Nyala. SUDO has no office in Kubum, its office in Garsila was closed following an arson incident in 2006 has not been reopened (partly due to objections by HAC) and its Zalingei office currently has no WatSan activity.

On the part of ACT/Caritas, there has been deep frustration that SUDO have tended to deliver reports and accounts late. This in turn has led to non-release of SUDO program funds and consequent resentment on the part of SUDO.

Nevertheless, I have been impressed by the technical competence of SUDO's WatSan staff and have no doubt that they wish to deliver a high quality service that achieves SPHERE standards. The ambition of SUDO to attain a wide geographical coverage could be advantageous if ACT/Caritas wishes to divest its WatSan operations (which are focussed on Kubum, Garsila and Zalingei) to SUDO. In summary, I would strongly agree with McKune's (2007) Health and Nutrition Sector Review: that SUDO's limitations are rooted in organisational and management disfunctionalities, rather than technical ones.

Specifically, the following recommendations apply to SUDO's activities (other minor recommendations are found in Chapter 11).

- Joint ACT/Caritas / SUDO / IRC and WES assessment of Bilel Camp to ensure compliance with SPHERE guidelines and to draft plans for medium-term handover of responsibility (if any).
- Handover of single borehole in Hashaba camp (Mershing) to World Vision for ongoing maintenance and management.
- Um Gozen sub-camp in Mershing currently falls far short of standards required by SPHERE in terms of water supply. Installation of additional water supply points in Um Gozen to ensure SPHERE compliance in terms of quantities supplied and number of delivery points.
- Ton Qitr sub-camp in Mershing currently falls far short of standards required by SPHERE in terms of water supply. Joint ACT/Caritas, World Vision and SUDO assessment and mapping of WatSan needs and installation of additional water supply points to ensure SPHERE compliance in terms of quantities supplied and number of delivery points. Mobilisation, training and provision of tools to a separate water and hygiene committee in Ton Qitr.

ACT/Caritas

ACT/Caritas, too, have suffered from a relatively high turnover of staff. This is partly related to a high proportion of international staff who may only be willing to remain on relatively short term contracts. ACT/Caritas should not be complacent about its staff's conditions and salaries – the inflationary effect of UNAMID's arrival and increased UN presence will undoubtedly cause some members of national and international staff to look elsewhere for employment.

ACT/Caritas are frustrated by the poor reporting and accounting procedures of their partner SUDO. Clearly SUDO must accept its share of responsibility for its infrastructural deficits and poor procedures, but I agree with McKune (2007)'s assertion that ACT/Caritas must also share a good deal of the blame for this situation. Given that one of the objectives of the DERO alliance has been to strengthen partners' capacities and given that ACT/Caritas has an office dedicated to Capacity Building, how has this situation been permitted to persist, three years into DERO's operation?

ACT/Caritas should be particularly grateful to their field coordinators, who have the day-to-day responsibility for implementing ACT/Caritas's WatSan program. Observations in Zalingei and Garsila suggest a high level of managerial competence (both at field coordinator and WatSan team leader level) and a high level of technical competence amongst staff. I believe that ACT/Caritas's activities in water supply provision to IDP camps (especially Khamsa Degaig) in Zalingei substantially fulfil SPHERE guidelines. Those in Garsila fall short of SPHERE Guidelines but it is noted that significant improvements are envisaged at Daba and Deleig camps within the 2007 financial year.

Within the water and sanitation sector, ACT/Caritas's greatest weakness is in the "software"/ community management side of the operation. The effectiveness of ACT/Caritas's rigs at drilling and rehabilitating hand-pumps in villages, damras and towns (i.e. outside of the IDP camps) has led to a situation where ACT/Caritas has acquired a de facto responsibility for over 200 hand-pumps in the Kubum, Zalingei and Garsila areas. I have yet to see clear evidence that water committees set up by ACT/Caritas experience any real responsibility for their hand-pumps – they have typically not been trained in pump maintenance or management and have no access to tools; more importantly, no effort has been made to encourage water committees to set a fee structure for users to cover costs of maintenance and parts. Without such structures, the lifetime of an unmaintained hand-pump (which may cost \$5000 to construct) may be as little as 1-3 years.

- DERO WatSan activities in 2008 should focus on achieving and maintaining SPHERE standards for water supply, sanitation, hygiene promotion, vector control and solid waste disposal in IDP Camps and Settlements.
- It is recommended that ACT/Caritas and SUDO significantly limit their activities in the drilling of new boreholes and hand-pumps during the coming financial year to cases where there is a clear emergency need. In the WatSan programme for 2008, activities in villages, host towns and damras should be focussed on establishing (i) functioning water management committees or trustees, (ii) training committees and/or local mechanics in hand-pump maintenance, (iii) establishment of spare parts networks and (iv) establishing revenue collection systems amongst users to pay for parts and maintenance, (v) participatory monitoring and evaluation.
- In the case of new hand-pump projects, consideration should be given to whether communities should be required to make an "up-front" financial contribution to the project. WES policy (Nyala) suggests a contribution of 3%, which would be \$150 or 300 SuP for a typical hand-pump project costing \$5000 USD.

The above assumes that the current security situation in Darfur will not improve during the coming year. If it does improve, leading to IDPs returning in large numbers to their villages, the above strategy may not apply.

- ACT/Caritas (and SUDO) should develop a contingency plan for a response in the WatSan sector, should security conditions improve to such a degree as to permit the return of IDPs to their home villages.

This report also makes a number of other recommendations for ACT/Caritas's WatSan program. The most important of these are detailed below, while the remainder may be found in Chapter 11.

- Water supply in Daba camp (Garsila) currently falls significantly below SPHERE guidelines. Plans for improvement of water supply in Daba camp (Garsila) should be quantitatively reviewed to ascertain whether the proposed improvements will result in SPHERE compliance in all three sub-camps. If SPHERE compliance will not be achieved with the 2007 works, further water supply improvements should be planned and budgeted for 2008. If additional boreholes are necessary, consider using WES rig to drill at larger diameter.

- At 3-monthly intervals, a team comprising WES, ACT/Caritas, TEAR Fund, IMC and InterSOS should visit the main IDP camps in Garsila to carry out quality control of WatSan provision and assess compliance with SPHERE standards.
- NGOs seem to expend a lot of effort rehabilitating household latrines that have collapsed during rains. Design of latrines should be reviewed with the objective of making them more resistant to collapse during the rainy season. Moreover, it would seem that, for household latrines, the responsibility for repair or rehabilitation should dominantly be with the household, not the NGO. ACT/Caritas, SUDO and other NGOs should explore with WatSan committees the hurdle to households assuming a greater degree of responsibility in this respect.
- WatSan and Hygiene Promotion teams should liaise more closely with UNICEF and NFI programs to coordinate distribution of soap (SPHERE guidelines require 250g per pers per month) with hygiene promotion campaigns. Informal discussions suggest that soap can be used a "door-opener" in the context of hygiene promotion house visits.
- ACT/Caritas (and SUDO) should develop a framework for systematic microbiological testing of all groundwater sources using the DelAgua kits. It should also regularly monitor microbiological quality of wells and hand-pumps within IDP camps to demonstrate SPHERE compliance (which requires the absence of faecal coliforms at the point of delivery). A system should be established for procurement and supply of consumables to field stations.
- ACT/Caritas should acquire groundwater level "dippers" for drilling staff (if not already provided) and train them in appropriate test pumping procedures, such as those recommended by MacDonald et al. (2005) and Misstear et al. (2007).

Phase-Out / Hand-Over of ACT/Caritas's Operational WatSan Program

ACT/Caritas have, over the course of three years in Darfur, created WatSan teams in their field offices with an excellent level of professionalism, diligence and competence. Current signs are that the Darfur crisis is not reaching a speedy resolution and may even deteriorate rapidly. In view of this, I would question the wisdom of DERO's (2006a) strategic plan to transfer operational activities to local partners, at least in the field of Water and Sanitation.

However, given that the Strategic Plan has been agreed, I must conclude that SUDO represent the only realistic alternative within the DERO partnership for the hand-over of ACT/Caritas's WatSan operational program¹. However, for reasons, explained above, SUDO (i) has historically promoted an advocacy and human rights agenda that has earned the periodic hostility of GoS and HAC, (ii) has no field office in Garsila or Kubum and no operational WatSan program in Zalingei, (iii) is very weak in capital resources (vehicles, computers, communication) and is not paying salaries sufficient to attract and retain adequately qualified national WatSan staff. I do not believe, therefore, that a handover can realistically be achieved by mid-2008. At least another full programme year must elapse before SUDO will be in a position to take over a significant component of ACT/Caritas's WatSan activities.

SUDO could conceivably be in a position to assume a significant part of ACT/Caritas's WatSan program by early to mid-2009, provided that this is preceded by a program of co-working on a joint WatSan program with ACT/Caritas, with staff located in combined offices in Zalingei, Kubum and Garsila. Furthermore, ACT/Caritas must second or embed administrative support staff within SUDO's Nyala office to ensure timely budgeting and reporting.

- It is thus recommended that the DERO partnership work towards the handover of ACT/Caritas's current operational activities in Water, Sanitation and Hygiene Promotion to SUDO in early-mid 2009, provided the following criteria are fulfilled.
- SUDO's and ACT/Caritas's WatSan program for 2008 (and 2009) must be jointly developed, agreed and budgeted as a combined DERO program.

¹ although WES (and water user committees) can be considered a potential end-point for the management and maintenance of the rural hand-pumps installed by DERO – see below

- SUDO must demonstrate their commitment to achieving an internationally acceptable level of WatSan service provision in their operations in Mershing and Bilel camps during 2008.
- ACT/Caritas and SUDO should operate joint WatSan offices and joint WatSan operations in ACT/Caritas's current operational areas of Garsila, Kubum and Zalingei throughout 2008. During 2008 SUDO staff work alongside ACT/Caritas staff to build their own capacity and to gain intimate organisation experience of the programmes and reporting regimes.
- SUDO should be willing to employ two-three new experienced WatSan staff to head SUDO's WatSan operations in Garsila, Zalingei and Kubum by March 2008.
- Following a program of co-working in 2008, SUDO should be provided with the opportunity to employ ACT/Caritas's existing national WatSan and hygiene promotion staff in Garsila, Zalingei and Kubum
- DERO must commit to developing a budget for 2008 and 2009 that will allow SUDO to build up an infrastructure (office space, communications, computers, vehicles) appropriate to the scale of WatSan operation for which SUDO is envisaged to take responsibility. ACT/Caritas must be prepared to transfer such resources that gradually become surplus to requirement during its transition to a "support and capacity building organisation". The ACT/Caritas drilling rigs are excluded from this consideration (see below).
- ACT/Caritas should locate their WatSan program officer within SUDO's office in Nyala during 2008 to assist SUDO's own Water Engineer and build capacity within SUDO as regards programming and budgeting. Furthermore, it is recommended that ACT/Caritas place an accountant/finance officer within SUDO's Nyala office during 2008/09 to assist with and build capacity in budgeting and financial/narrative reporting.

Capacity Building

As outlined above, the most effective method of capacity building will be for SUDO staff to work closely alongside ACT/Caritas staff in the same physical location and on a joint WatSan program. Additionally, SUDO's senior staff would benefit from workshops and training sessions in the following areas:

- Development of coherent programming skills
- Reporting
- Training in international standards of relief provision (SPHERE)

Technical staff at both ACT/Caritas and SUDO will benefit from training workshops in the following areas:

- The TEAR Fund "Darfur: Relief in a Vulnerable Environment" report, which is likely to form the basis of a UNEP program in 2008. This should incorporate a session on "Livelihood, resources and power" outlining how provision of water can be used as an element in a power struggle (Brendan Bromwich of UNEP has indicated his willingness to facilitate this workshop).
- Improved methods of test pumping and groundwater source monitoring.
- Water quality – our responsibilities.
- Community contribution to, and management of, water sources, with an emphasis on tariff-setting by user committees. Participatory approaches in community-based projects in emergency scenarios.
- In-depth training on PHAST

The ACT/Caritas Drilling Rigs

The ACT/Caritas drilling teams appear to have developed into such coherent and efficient units that I cannot recommend a straight handover of these to another partner until that partner has demonstrated a proven track record in (a) personnel management and retention and (b) WatSan operationality. Furthermore, given the recommendation that ACT/Caritas and SUDO should consider reducing their drilling activities in favour of promoting effective community management of hand-pumps, it would seem unwise to locate the rigs with an organisation that may not have a budget to fully utilise their capacity.

- If ACT/Caritas does not wish to retain and implement a drilling capacity, it is recommended that the drilling rigs be reorganised to form a financially and managerially autonomous unit – for example “DERO Drilling” – commencing operating no later than the start of 2009. For such a drilling unit to be viable, it would also need to acquire geophysics equipment, a competent manager and a field geologist/geophysicist. The unit could simply be an autonomous NGO within the DERO partnership or even a limited company (with the DERO partners as shareholders).

For this concept to become a reality, its financial viability would need to be assessed and a business plan developed. Moreover, substantial potential legal obstacles would need to be evaluated and overcome, and donor attitudes to the hand-over would need to be evaluated.

- If the “DERO Drilling” concept is found not to be viable, handover of the drilling rigs and crews to WES (1 to West Darfur, 1 to South Darfur) should be considered. Any hand-over protocol should ensure the availability of the rigs to DERO partners at a reasonable cost.

Transfer of Hand-Pump Maintenance Responsibility to WES

By its focus on the drilling and rehabilitation of hand-pump facilities and its neglect to establish functioning and responsible water committees amongst users, ACT/Caritas have acquired a de facto responsibility for maintaining in excess of 200 rural hand-pumps in villages, damras and host towns. WES and UNICEF envisage WES as having a role in accepting a joint responsibility (with the user communities) for maintaining such facilities following the departure of INGOs. However, there is a clear lack of capacity (especially in terms of mobility) in the smaller WES offices.

- It is recommended that ACT/Caritas aim to transfer responsibility for hand-pump maintenance to WES and user communities in the medium term (end of 2009). This must not, however, be a rapid “hand-washing” exercise but must be carried out gradually, with the development of spare-parts and mechanics networks and with material support for WES.
- ACT/Caritas and SUDO should, in 2008/09, be willing to focus on developing responsible water user committees (especially in communities outside IDP camps): community management structures and capacity building; training in hand-pump maintenance; revenue collection to pay for parts and maintenance.
- ACT/Caritas, together with WES and other NGO, should formulate a programme to set up revolving spare parts funds and centres in Kubum, Garsila and Zalingei, from mid-2008. A limited number of local mechanics should be trained and associated with the centres, whose services would be paid for by the community members.
- ACT/Caritas should, during 2008, expand the capacity of WES by contributing mobility (probably in the form of motor cycles for WES staff) and possibly also communication facilities. Training should be provided to WES staff in well maintenance, hygiene promotion, record-keeping, tariff-setting and reporting.
- The Ministry of Irrigation and Water Resources, possibly in tandem with UNICEF, should be willing to support the salaries of an adequate number of educated staff at WES in Zalingei, Garsila and Kubum to manage a hand-pump maintenance activity. Negotiations with WES and UNICEF should commence immediately.
- WES should be enticed back to re-open their Kubum office during 2008. This may involve DERO joint-funding the salaries of staff and office space for a limited and pre-specified period

of time. UNICEF in Nyala should be approached to obtain support and possible joint funding for this activity.

Cross-Cutting Issues

Gender

Gender is simply not an issue which forms a central part of ACT/Caritas's WatSan program, either in Nyala or in the field stations. This may partly be due to a culture where male sheikhs influence the selection of water and hygiene committees, but is undoubtedly also due to the fact that women are grossly under-represented in ACT/Caritas's and SUDO's staffing. To make some headway in rectifying this situation:

- ACT/Caritas and SUDO must make a conscious effort to employ a significantly greater proportion of women in its WatSan programme, both within its international and senior national staff and within its teams of community mobilisers.
- Ms Darnaim Adam should be invited to contribute to a workshop for other WatSan and Hygiene Staff in order to communicate her strategy and experiences of mobilising women in Daba camp.

Environment

The report by Bromwich et al. (2007), which will form the core of a forthcoming UNEP program, stresses the need for operational NGOs to monitor motorised abstractions of groundwater to prevent localised overabstraction and to assure source security.

Furthermore, the responsible archiving of hydrogeological data (drilling logs, water quality analyses, pumping data and monitoring data) forms the basis of an environmental database which will ultimately be hugely valuable for the future management of Darfur's resources. ACT/Caritas is already operating an archive of drilling logs and analyses, which are passed on to UNICEF and WES.

- Water level dipping tapes should be acquired for pump operator staff at dug wells in Khamisa Degaig and Deleig camps by March 2008. Training should be provided to operators in measuring water levels. Water levels should be monitored at least twice every day in the pumped dug wells (i) before pump switch-on each morning (rest water level) and before the cessation of pumping each evening.
- Simple groundwater level monitoring loggers ("divers") should be installed in the "Central" borehole of Deleig and in the three boreholes at Daba by March 2008. ACT/Caritas (and eventually SUDO) staff should be trained in downloading such logger data at regular intervals, interpreting and archiving this data. Every 6 months the combined data shall be reviewed by a professional hydrogeologist.
- ACT/Caritas should continue to archive drilling logs, water analyses (and any water level monitoring data) in an efficient database and submit it to UNICEF/WES and UNEP. Additionally, drilling logs and analyses should be systematically copied. Hard-copy and digital data should be sent to the Geological Survey of Sudan and to an international archive such as the library of the Geological Society of London (this can be arranged by the author).

5 INTRODUCTION

5.1 DARFUR CONTEXT

The following is based upon the Introduction provided in the Health and Nutrition Sector Review by McKune (2007).

The current crisis in Darfur began in early 2003, when rebel forces based in Darfur launched attacks against the Government of Sudan (GoS), challenging president Omar al-Bashir. President al-Bashir's troops, allied with armed militia groups drawn from some portions of the Arabic pastoralist peoples of Darfur, responded with force, attacking villages belonging to non-Arabic Fur, Zaghawa and Massalit peoples who share the same ethnicity as the rebel groups. The conflict is believed to have resulted in at least 200,000 deaths and to have displaced over two million people (the majority as IDPs to other villages and camps around larger towns in Darfur, a large minority to refugee camps in Chad). The perception of the conflict as "ethnic cleansing" of African peoples by Arabs is undoubtedly a gross oversimplification. The conflict has complex political and historical roots and the GoS is widely believed to have manipulated long-standing livelihood-based tensions between dominantly pastoralist "Arabs" and their farming neighbours as a tool to strangle the rebel movement. Furthermore, the "aggressors" represent only a minor portion of the Arab peoples of Darfur and in 2006, Arab-Arab conflicts resulted in Arabic groups, too, moving into IDP camps. There is reportedly a growing recognition amongst some Arabic groupings that they have been manipulated in the early stages of the conflict. To further complicate matters, the original rebel movement has now split into numerous factions (including at least two of the SLA and the JEM).

In May 2006, the Darfur Peace Agreement offered hope that an end to the crisis might be near. The GoS and one of the (then) three rebel factions signed the agreement. Initial hopes that the remaining two factions would sign quickly dissipated. There are currently 7400 African Union (AMIS = African Mission in Sudan) troops in Darfur, whose mandate is to monitor and report ceasefire violations. Since the Peace Agreement there has been a sharp deterioration in security. In the first half of 2007, an estimated 140,000 new IDPs were displaced (Okabe 2007), 57 humanitarian vehicles were hijacked and 6 humanitarian compounds have been broken into.

In June 2007, UN Resolution 1769 extended AMIS's mandate to the end of 2007 and approved the formation of a UNAMID UN Peacekeeping Force, numbering up to 26,000. This force may start to arrive as early as October 2007 but is likely to be only fully present by the beginning of 2008. There is a general consensus that the expectations engendered by the arrival of the UNAMID force are unlikely to be realised in the short-term, a situation that could easily lead to disillusionment in Darfur. This, coupled with the jockeying of the various rebel factions to obtain positions of strength in advance of the forthcoming Tripoli Peace talks, could easily lead to the security situation deteriorating further in the near future, before any improvement is realised. In fact, at the time of writing, armed clashes in Zalingei have led to three of ACT/Caritas's staff being abducted and held hostage.

5.2 DERO

In response to the escalation of the Darfur, a coalition of humanitarian organisations came together in June 2004 to form DERO, the Darfur Emergency Response Organisation. Funded by over 60 agencies from the ACT and Caritas networks, DERO operates in South and West Darfur through four implementing partners: ACT/Caritas, SUDO, SCC and Sudanaid.

The memorandum of understanding (MoU) signed between ACT, Caritas Internationalis, NCA and CAFOD in July 2004 identified the objectives of the joint ACT/Caritas response operation in Darfur as being:

1. To maximise the response of the ACT alliance and the Caritas confederation to the crisis in Darfur so as to honour their duties under the humanitarian imperative.
2. To uphold the values of partnership and ensure that partners are able to maximise their contribution to the humanitarian response in Darfur.

3. Where necessary, to develop an operational response to enable ACT and Caritas to meet the difference between 1 and 2 above.
4. To coordinate, use and maximise the resources of ACT/Caritas and to establish programs through which the members of ACT and Caritas can channel their human, financial and other resources.

DERO completed a Strategic Planning Process in September 2006, overseen by a taskforce that included representatives from the Darfur, El Obeid and Khartoum levels of the implementing partners and the Country Representatives of the two lead agencies (NCA and CAFOD). The outcome of the Process was a mandate that restructures DERO into a support mechanism for national partners. The plan aims to increase SCC, SUDO and Sudanaid's organisational capacity so as to directly implement their own programs or to work directly with local partners, CBOs or government ministries. The Plan aims to phase out all activities directly implemented by ACT/Caritas (DERO 2006a).

Health/Nutrition and WatSan are the two largest sectors within DERO, both in terms of expenditure and staffing. ACT/Caritas and SUDO are the only two members of DERO engaged in the WatSan area, both implementing programs involving water supply, sanitation facilities, hygiene promotion, vector control (mainly spraying) and solid waste disposal. SUDO operate WatSan activities largely in South Darfur (Nyala area, Ed Daein), with a minor proposed activity in Zalingei. ACT/Caritas operates WatSan activities from field stations in Zalingei and Garsila (West Darfur) and Kubum (South Darfur). There is thus little geographical overlap between operations of the two organisations.

Given the strategic significance of the Health/Nutrition and WatSan Sectors' development, the 2007 appeal committed DERO to undertaking a sector review for each of the sectors. It was originally anticipated that the two sectoral reviews would be undertaken simultaneously. For external reasons, the Sector Review for Health/Nutrition was completed by July 2007 (McKune 2007), while the WatSan Sector Review was delayed to September. This review will try to follow the model of McKune's (2007) document as far as possible.

5.3 A BRIEF NOTE ON WATER SUPPLY

Water supply in Darfur is overwhelmingly from groundwater. There are three types of aquifer (see Figure 1):

- 1) Wadi aquifers, often filled with permeable sand, silt and gravel. It is common practice for nomads and villagers to dig (often temporary) wells in the wadis. The water table falls as the dry season progresses and may even disappear. After heavy rainfall, the wadi fills rapidly with torrents of poor quality run-off, often sweeping away wells that may have been constructed there. Some of the water in the wadi infiltrates the ground, recharging the wadi aquifer and underlying rocks.
- 2) Precambrian basement aquifers. These underlie much of South and West Darfur and comprise granites, gneisses, other igneous rocks and meta-sediments. They are usually poorly permeable. The upper weathered rind of rock often contains more groundwater than the fresh bedrock below (where water only flows via small cracks and fissures in otherwise solid rock). They are usually poorly permeable. Well yields are unpredictable and low (>1 L/s would be considered good). Geophysics is often used to locate wells.
- 3) Nubian Sandstones. Typically occur in the north, south and east of Darfur (e.g. below Ed Daein). These are regionally important sedimentary layers, several hundred metres thick, where groundwater occurs in large quantities in pore spaces. The water table may be very deep. A significant component of the water may be very old – having been recharged in the so-called "pluvial" times over 5000 years ago.

The rainy season in Darfur is typically in June-August, stretching into September.

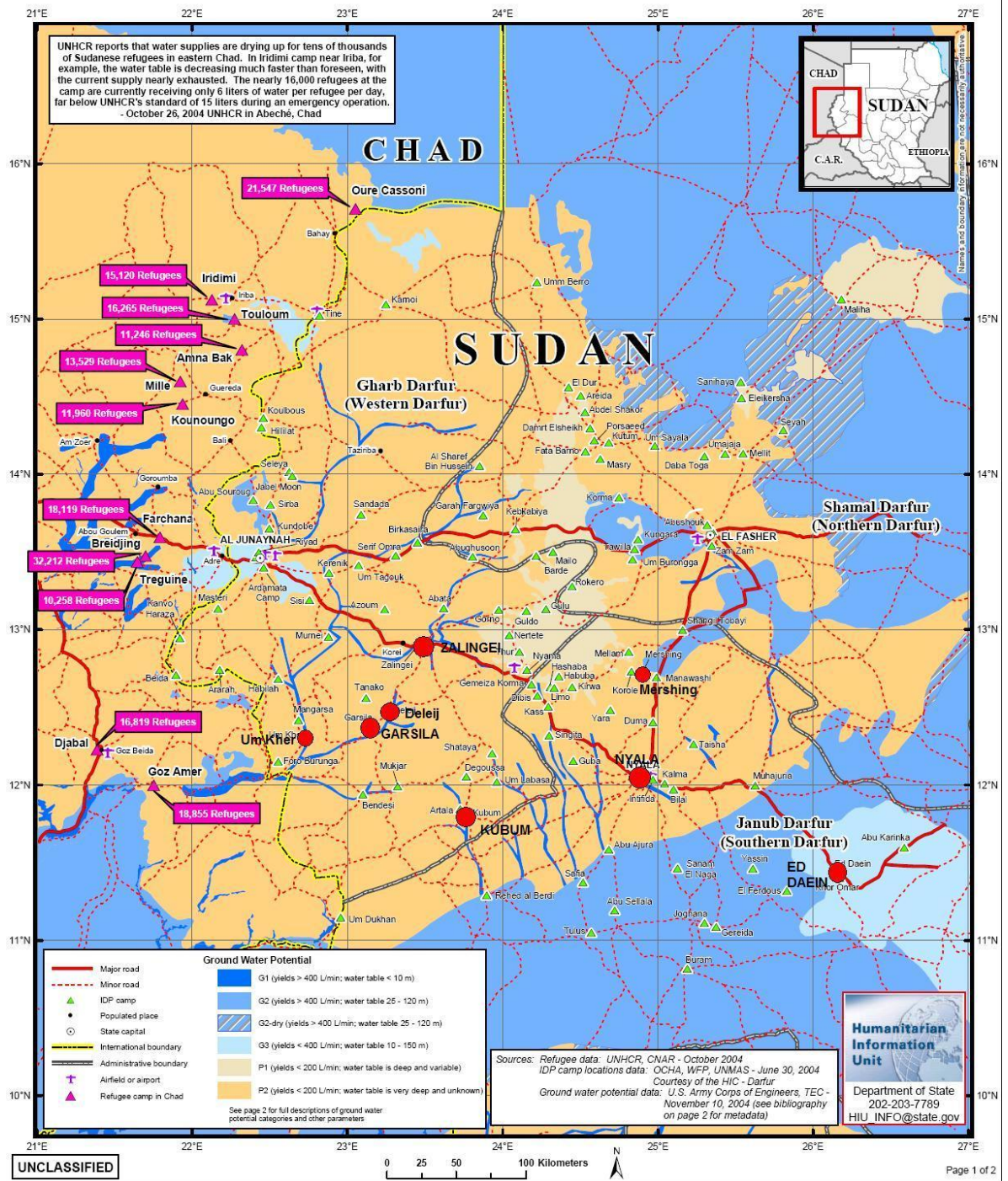


Figure 1. Groundwater potential map of the Darfur region. In general the darker orange represents the Basement Complex; the mid-blue represents the Nubian Sandstones and the dark blue lines are the main wadi aquifers. After HUI (2004).

6 OBJECTIVES AND METHODOLOGY

As outlined in the joint Health/Nutrition and WatSan Terms of Reference (Appendix A), the objectives of this study have been to:

- To review the performance, achievements, challenges and capacity (organisational and technical) of the DERO members.
- To review progress and evaluate existing phase-out and handover processes.
- To ascertain which component(s) of the sector should be phased out or handed over and, in the latter case, to whom and over what timeframe.
- To conduct a mapping exercise of other agencies/departments that operate or plan to operate in DERO areas to ensure that DERO operations are adding value as opposed to duplicating the humanitarian services of others.
- Where DERO members show potential to progress and improve, to identify what capacity development inputs would be required.
- To enhance DERO members' understanding of their long-term priorities/commitments, sectorally and geographically, and how this relates to their current capacities and performance.
- To set progress indicators for proposed recommendations.

Regrettably, the time available (3 weeks) for the review was shorter than initially envisaged. Difficulties in obtaining permits and flight bookings shortened the available time in Darfur to around 2 weeks. Taking into account the severe limitations imposed by security considerations and flight availability resulted in only 1 week being spent in field assessment outside Nyala: in fact only SUDO's operation in Mershing Camp, and ACT/Caritas's operations in Garsila and Zalingei were able to be viewed first hand.

In the light of the above, the consultant has been unable to carry out the full scope of the Review strictly according to the ToR presented in Appendix A. The consultant has, however, used a variety of approaches to undertake the assessment as fully as possible, including:

- Interviews with key ACT/Caritas and SUDO staff.
- Interviews with staff of other organisations, including WES, Ministry of Health and UNICEF.
- Review of key documents (see Chapter 12)
- Collection of quantitative information at IDP camps, largely from bladder/pump operators and water users.
- Discussions with water users (men, women and children), community mobilisers, water and hygiene committees and sheikhs' groups.
- Field visits and own observations.

The main standards and guidelines utilised in this assessment have been:

- The SPHERE (2004) handbook, laying down basic standards in emergency humanitarian aid. The key indicators for the WatSan sector are reproduced as Appendix C.
- The guidelines for groundwater resource sustainability outlined in the recent TEAR Fund (Bromwich et al. 2007) report – Appendix B.
- Guidelines for community participation in hand-pump projects communicated by WES (Nyala) and UNICEF (see text box 9.2).
- Common sense.

The assessment was carried out in the period 11th September – 29th September 2007 by David Banks, (consultant in hydrogeology, environmental geochemistry and thermogeology) appointed to DERO via Norwegian Church Aid's emergency response roster. A timetable of meetings and field visits is provided as Appendix D. The assessment was funded by ACT/Caritas, although the views expressed in this report are those of the consultant (unless otherwise clearly identified).

The structure and introductory text of this report largely follow those utilised in the Health and Nutrition Sector Review of McKune (2007).



Figure 2. Women collecting water from temporary (10 day old) wells in the wadi at Mindo, near Garsila.

7 ORGANISATIONS

Sections 7-9 provide commentary and analysis of the organisations and program activities relevant to the SUDO partnership.

Section 7 contains a brief description of the various key organisations in the WatSan sector encountered during this Review. It does not deal in any detail with INGOs or other NGOs than those within the DERO network. SCC and Sudanaid are not considered in this section as they do not actively implement programs in the WatSan sector. Where the organisation is a possible candidate for the handover of ACT/Caritas's operational program, the organisation's capacity is considered in this context.

The capacity of ACT/Caritas's field offices is commented location by location in Chapter 8.

Section 8 describes SUDO activities, with especial emphasis on the IDP camp in Mershing (the only one of SUDO's activities able to be viewed as part of this assessment (due to security issues elsewhere)).

Section 9 describes ACT/Caritas's WatSan activities implemented from its field stations in Garsila and Zalingei. It also touches on the activities of the Kubum station, although this was not visited and is based on information collected from ACT/Caritas staff.

Box 7.1: Is SUDO an equal partner in the DERO alliance?

Having visited SUDO's offices in both Nyala and Zalingei, it becomes clear that SUDO is not an equal partner with ACT/Caritas in the DERO alliance. SUDO is poor in resources: 1 vehicle only in Nyala and 1 in Zalingie (plus 2 in Ed Daein). The organization has little computer and communications equipment (a single handset in Zalingei). How has this situation been allowed to arise? Is it poor budgeting on the part of SUDO, or discrimination against a "national" NGO by ACT/Caritas when dividing up donor resources?

It is also clear that salaries paid by SUDO are inadequate to retain qualified staff. This situation will only get worse with the imminent arrival of UNAMID – UN guards are rumoured to be paid twice the salary of a water technician. Are low salaries the consequence of SUDO policy or of constraints by ACT / Caritas / DERO when finalising and editing budgets? Do the salaries budgeted by SUDO tally with the salaries actually paid to staff?

A common opinion within ACT/Caritas is that SUDO have consistently been overambitious in programming and budgeting (DERO 2006b; Annex 3). Thus, when a proposed budget eventually has to be cut to meet real donor supply, SUDO's response is to try and maintain a high level of ambition and geographical scope – but to do it cheaper. We thus see situations developing where 2 vaccinators work for 1 vaccinator's wage (Mershing camp), a mere 3 boreholes are drilled in an IDP camp of 6000 souls (Um Gozen, Mershing), capital investment in hardware and communication is neglected and salaries are paid at a level inadequate to retain staff. If this opinion is true, then SUDO are guilty of poor programming and of sacrificing quality for quantity / coverage. ACT/Caritas are, however, also guilty of not taking steps to identify and rectify this situation. SUDO would argue that budget cuts have been made insensitively by ACT/Caritas with consultation, and presented as faits accomplis.

Do SUDO's internal difficulties matter for ACT/Caritas? Emphatically, yes. The result is that SUDO has become so weakened in terms of qualified staff and material resources, especially in the WatSan sector, that it cannot realistically be expected to take over ACT/Caritas's implementing role in the WatSan sector in the near future.

7.1 SUDO

7.1.1 Overview

SUDO started life as an advocacy organisation. Its criticism of the Government of Sudan has led to it being sporadically banned from actively working as a relief agency at different times throughout the Darfur crisis (especially in Zalingei and Garsila). SUDO operates Sudan-wide (including Kordofan, South Sudan, the Eritrean/Ethiopian border area and Khartoum).

SUDO started operations in Darfur in 2002, with assistance to Dinka IDPs in Ed Daein. Although SUDO also has offices in Al Geneina and El Fasher, 95% of SUDO's funding is via the DERO/ACT/Caritas network and is implemented via three offices in Zalingei, Ed Daein and Nyala. These three offices support around 150 staff (around 70 from Nyala).

SUDO has its head office in Khartoum and all budgets and reports must be approved by Khartoum.

Box 7.2: DERO: if we're working together, why aren't we working together?

In Nyala, both SUDO and ACT/Caritas have a WatSan operation. In Zalingie, ACT/Caritas has an extensive WatSan operation but SUDO has only an ambition for this (due to lack of access to technical staff). In Zalingei, both ACT/Caritas and SUDO have PPP and health activities.

Why are the water engineers and hygiene promoters from SUDO and ACT/Caritas sitting in different offices in the same town, if they are meant to be working together? By sitting in a single locality, SUDO's national staff could draw upon the wealth of global experience represented by ACT/Caritas's international staff. The latter would have access to the deep local knowledge held by SUDO staff. If ACT/Caritas are meant to be building capacity within SUDO, the best way for this to happen is to work in the same location, on a joint work programme, for which SUDO could assume ever greater responsibility as ACT/Caritas withdraws from active implementation.

On the other hand, the physical separation of ACT/Caritas and SUDO may benefit the former. SUDO originated as an advocacy organization, critical of the Government of Sudan. Indeed SUDO, especially in Zalingei, has been suspended from operating by HAC on a number of occasions. If ACT/Caritas wishes to maintain a status as an operational humanitarian relief organization, it may be beneficial to maintain a degree of distance from SUDO. Can SUDO expect to be both an advocacy and an operational relief organization in the prevailing political climate? If it chooses advocacy, it may not be realistic to expect SUDO to be able to operate ACT/Caritas's WatSan relief activity. If it chooses the latter, ACT/Caritas and SUDO should share offices and projects to a much greater extent, to build capacity in SUDO and a mutually agreed approach and strategy pending devolution of ACT/Caritas's operability to SUDO.

It appears that SUDO's and ACT/Caritas's strategic planning and budgeting take place in relative isolation from each other, leading to over-optimistic budgeting, divergent programming and simmering discontent over final budget allocations. If both are part of the DERO partnership, why is there not (as John Distefano suggests) a joint planning of the forthcoming year's program to assess overall needs. Once agreed, the proposed program could be either equitably divided between SUDO and ACT/Caritas depending on specific strengths, capabilities and geographical locations or (heaven forefend!) jointly implemented using common resources.

7.1.2 Technical and Organisational Capacity

SUDO has a highly qualified hydrogeologist employed as Head of Water and Sanitation programme in Khartoum.

Within Darfur, WatSan staff are well-qualified but few. 1 water engineer and 1 sanitation engineer are employed in Nyala, and 1 water engineer was employed in Zalingei but left a few months ago (see below). I have no reason to doubt the technical competence of SUDO's senior WatSan staff. They seem aware of international (SPHERE) standards and that some of their activities fail to achieve these standards. They are clearly highly educated and articulate professionals.

SUDO have no office or program in Garsila or Kubum. SUDO did previously have an office in Garsila, but during an incident in Deleig camp, the SUDO office (and a TEAR Fund car and staff) was attacked and burned by IDPs. SUDO have reportedly attempted to return several times to Garsila, but have been blocked by HAC.

SUDO in Zalingei have currently no water engineer or technician. They have, in theory, a project this year to drill (using the ACT/Caritas rig) 10 boreholes and carry out hygiene promotion in farming villages in the higher parts of Jebel Marra. However, local government has prevented all access by NGOs to this area as it is considered an SLA stronghold. SUDO in Zalingei had a water engineer until 4 months ago, but he left, reportedly due to his low salary (900 SUP per month). The head of SUDO in Zalingei is currently trying to recruit a new engineer, but believes he needs to be able to offer 1500 SUP per month to attract a good candidate. Thus, currently, there is no active planning for a WatSan component in 2008.

I believe that SUDO's operational capacity in WatSan is highly constrained by a number of facts:

- consistent underinvestment in equipment, communications and vehicles.
- underpayment of key (especially senior) staff, resulting in non-retention of staff.
- its episodically poor relationship with the Government of Sudan and, especially, HAC, which have constrained its ability to operate in Garsila and Zalingei.
- lack of technicians and junior WatSan staff who can oversee projects on the ground.
- poor consistency and timeliness in reporting (according to ACT/Caritas staff).

The reasons for these difficulties cannot wholly be laid at SUDO's door and are discussed further in Box 7.1.

7.1.3 Handover / Capacity Building

Of the DERO partners, only SUDO has an existing capacity and program in the WatSan sector. It thus seems natural that SUDO would be the main choice for handover of ACT/Caritas's existing operations. I do not believe that SUDO are in a position to take over ACT/Caritas's WatSan program by the middle of 2008, as the Strategic Plan (DERO 2006a) suggests. The reasons for this are the limitations on SUDO's capacity (outlined above in 7.1.2) and their lack of operationality in Kubum, Garsila and Zalingei (where ACT/Caritas's WatSan program is based).

7.1.4 Recommended Future Action

I believe that a transfer of ACT/Caritas's WatSan program to SUDO can only be achieved by 2009 if:

- During 2008 SUDO staff work alongside ACT/Caritas staff in Garsila, Zalingei and Kubum on a joint program to gain intimate organisation experience of the programmes and reporting regimes (see Box 7.2).
- SUDO are willing to employ two-three new experienced WatSan staff to head SUDO's WatSan operations in Garsila, Zalingei and Kubum.
- Following a program of co-working in 2008, SUDO are provided with the opportunity to employ ACT/Caritas's existing national WatSan and hygiene promotion staff in Garsila, Zalingei and Kubum.
- SUDO are able to successfully budget for a dramatic improvement in logistical capacity for Zalingei, Garsila and Kubum (vehicles, communications and office equipment). Some of these resources could conceivably be transferred from ACT/Caritas.
- SUDO are able to demonstrate their commitment to achieving an internationally acceptable level of WatSan service provision in their operations in Mershing and Bilel camps.

This will be discussed further in Chapter 11.

7.2 MINISTRY OF HEALTH

7.2.1 Overview

The Ministry of Health's (MoH) hygiene promotion division was visited in Nyala. The office has no autonomous hygiene promotion programme. The division's hygiene promotion staff works almost exclusively in collaboration with NGOs in the IDP camps (the MoH pays staff salaries, but NGOs typically provide equipment, transport and an incentive in the form of a field allowance). Within the camps, the staff run workshops, perform house visits, promote hygiene in schools and women's groups. No specific methodology is reported to be used.

The staff have historically also acted within Nyala town in response to emergency events such as an outbreak of acute watery diarrhoea in 2006. In the rainy season, MoH carries out some chlorination at water sources or in donkey carts in Nyala town.

The MoH also organises solid waste collection by tractor from some sections of Nyala town. MoH has a truck and 20 hand-pumps for spraying for insect control in Nyala town and the IDP camps. 40,000 mosquito nets have been distributed to children and women (aged 15-45) in towns in South Darfur and Kass.

7.2.2 Technical and Organisational Capacity

The Nyala office and organisation appear very run down, with minimal equipment. Although it receives health data from clinics and health centres (including ACT/Caritas) its information processing capabilities are minimal.

The division in Nyala has 12 hygiene promotion staff (4 men, 8 women). Although no detailed assessment has been carried out, I have no reason to doubt MoH staff's technical capacity. MoH offices in Zalingei or Garsila were not visited, but discussions with ACT/Caritas staff suggest that the situation and capacity are no better than in Nyala (and in, all probability, worse).

7.2.3 Handover / Capacity Building

The MoH hygiene division could be considered the logical end-point for transfer of some of DERO's hygiene promotion activities. However, as the DERO partnership attempt to integrate hygiene with sanitation and water supply provision, it would seem more logical to look to WES as the ultimate handover point for DERO's rural WatSan activities in the long term. WES's hygiene promotion capacity is, in any case, reportedly seconded from the MoH (see below).

7.3 SWC

At a national level, the organ formally responsible for water supply and water resources in Sudan is the National Water Corporation (NWC). This is, in turn, responsible to the national Ministry of Irrigation and Water Resources.

At a state level (e.g. South Darfur), this role is carried out by the State Water Corporation (SWC). This is responsible to the State Ministry of Urban Planning and Public Utilities (there is no Ministry of Irrigation and Water Resources at state level). In theory, SWC is responsible for all water supply. In practice, however, WES is responsible for activities which are (a) emergency measures, or (b) hand-pump installation and/or (c) in the crystalline basement area. The activities in which SWC is involved thus include: (a) non-emergency establishment and rehabilitation of water yards and deep boreholes, (b) surface water resources, (c) urban water supply. SWC in Nyala have two Dando deep drilling rigs.

At water-yards SWC collects a tariff from both livestock watering and from human consumption. The tariff varies from place to place. 0.1 SuP per jerry can is not atypical, according to SUDO.

In some cases, SWC may be present in individual localities in the form of Locality Water Corporations (LWC). The LWC in Garsila is very limited in terms of capacity with a single very demoralised engineer in more-or-less sole charge of the town water supply.

7.4 UNICEF

UNICEF were visited in Nyala. They have no implementing role in WatSan but rather see their role as coordinating the NGO community and supporting the WES project (see 7.5). UNICEF also supports hygiene program and WatSan programs by provision of visual aids and spare parts. UNICEF, at a workshop with the other NGOs, has reportedly developed an integrated plan for WatSan for 2008. UNICEF have appointed lead agencies for WatSan in the various areas of Darfur and ACT/Caritas has been appointed lead agency in Kubum (by virtue of the fact that it is the only agency in WatSan in Kubum!). Finally, UNICEF collects information (including drilling logs, analyses etc) from the NGOs working in the field and hands it on to WES. They are currently working to compile and maintain a database of all borehole information from the region to make available as a tool to the various NGOs.

7.5 WES UNITS

7.5.1 Overview

WES (Water and Environmental Sanitation) Units are a concept that has been employed in Darfur and Kordofan since 1992 to provide integrated rural water supply, sanitation and hygiene promotion. In fact, the demand for water supply has been used as a lever to persuade communities to initiate action in sanitation and hygiene. WES draws on staff from three different organisations: the State and Local Water Corporations (around 30% of staff), the Ministry of Health (40%) and the Ministry of Social Affairs (20%).

WES was initially funded by UNICEF, but over time the Government of Sudan (GoS) and local communities have taken on a share of funding, although the proportion of funding varies depending on the type of project. Mr Gafar Ahmed states that, for a rehabilitation of a water yard, UNICEF would typically currently provide 75% of funding and GoS 25%.

WES have traditionally focussed on water supply issues in rural villages. When planning a new water supply scheme, WES would typically attempt to identify a water management group of maybe 10-15 people from each village. These would be trained: 2 in hand pump maintenance, 2 in sanitation (which may cover solid waste collection and sanitation) and 2 in hygiene promotion (UNICEF and MoH materials used). Ideally these would be embedded within the Village Development Committee established by CFCI (a government unit for rural development also partly funded by UNICEF). Before embarking on any technical work, the village would be expected to pay 3% of the total project cost "up front" for a geophysical survey. The results would be presented to WES and, if favourable, WES would then commence drilling (they have two shallow drilling rigs of their own) and installation of the hand-pump (Sudan appears to have standardised on the India Mark II). The villagers would be encouraged to set a tariff for collection of water from the hand-pump, which is adequate to cover procurement of spare parts and sometimes also additional village improvements such as communal latrines at market places. The village would be required to set up a "Spare Parts Centre" which would be supplied by WES at a fixed price. Maintenance would be performed by trained members of the village.

(It should be noted that WES in Zalingei does not ask for any up-front payment or tariff for its water projects: all services are provided free of charge).

For construction of household latrines, villagers would receive a latrine slab (or money to purchase slab construction materials), and would be expected to provide labour.

DERO should note the emphasis placed by WES on a modest monetary contribution to the establishment of the water point and the expectation that water will be supplied against a tariff. DERO's current policy of establishing water points and providing maintenance free of charge is contrary to WES policy and will be extremely difficult to reverse.

Naturally, the recent conflict has significantly impacted both infrastructure and management systems and much of WES's current work is in trying to rehabilitate and re-establish existing systems.

WES also work in WatSan within IDP camps around Nyala. Here, water is supplied free of charge, although the IDP community may be requested to pay a small contribution for a guard for the water point.

WES have offices in Nyala, Ed Daein and Zalingei (and Zalingei has field stations in Garsila and Nertiti). WES are not present in Kubum (in fact, UNICEF claim that WES's operations in Kubum were handed over to ACT/Caritas in 2005). WES do not operate in areas not controlled by the government. In areas where WES is present, they see part of their role as taking over completed hand-pump projects implemented by NGOs to ensure that they are responsibly handed over to the community and to ensure that they are operated sustainably. Where WES is not present, NGOs must ensure sustainable hand-over to local communities themselves, preferably using the model described above.

7.5.2 Technical and Organisational Capacity

According to both UNICEF and WES, WES in Nyala has significant staffing and vehicle capacity to assist NGOs in their activities and even to assume responsibility for INGO projects on closure. WES Nyala currently operate two shallow-medium depth drilling rigs, which are continuously operational.

WES in Zalingei has five water engineers, three hygiene workers and a drilling rig (currently working in the region around Al Geneina), but its capacity is limited by its single vehicle. Due to its proven role prior to the recent Darfur conflict, WES enjoy a high degree of recognition and trust amongst the populace. WES was involved in well construction and other WatSan activities in the camps of Zalingei between 2004-06, but withdrew after 2006, following rumours of water supply poisoning, culminating in the arson of a SUDO facility and concomitant fatalities. WES in Zalingei hold fortnightly coordination meetings with the NGOs.

In Garsila, the capacity of WES is so low as to be non-existent. WES's sole employee is the demoralised water engineer from Garsila Water Corporation. His commitment to WES is essentially unsalaried and performed in parallel with his main job in GWC. WES formerly had some activity in hand-pump maintenance but stopped "because TEAR Fund were doing it" and WES has lost its hand-pump mechanic due to lack of a salary. WES in Garsila do maintain a stock of spare parts for India hand-pumps, and of chlorine.

7.5.3 Handover / Capacity Building

Intuitively, WES ought to be the natural recipient for maintenance of hand-pump facilities installed by SUDO and ACT/Caritas as part of their programs. Indeed, WES and UNICEF see themselves in this role. However, there is a clear lack of capacity (especially in terms of mobility) in the smaller offices and, I suspect, a lack of real motivation. Furthermore, most NGOs (including ACT/Caritas) have flown in the face of WES policy by installing hand pumps free of charge in towns and villages and have neglected to train water committees in hand-pump maintenance and tariff setting.

7.5.4 Recommended Future Action

If ACT/Caritas's accumulated mass of installed hand-pumps (which may be 80-100 in each of Kubum and Garsila and 50 in Zalingei) are to be responsibly handed over to WES in 2009:

- ACT/Caritas and SUDO must in 2008 focus heavily on training water committees (especially in communities outside IDP camps) in hand-pump maintenance and on encouraging them to collect revenue to pay for parts and maintenance.
- ACT/Caritas, together with WES and other NGOs operational in Garsila and Zalingei, should formulate a programme to set up a revolving spare parts fund and centre in Kubum, Garsila and Zalingei. A limited number of local mechanics should be trained and associated with the centre, whose services would be paid for by the community members.
- ACT/Caritas should expand the capacity of WES by contributing mobility (probably in the form of motor cycles for WES staff) and possibly also communication facilities. Training should be provided to WES staff in well maintenance, hygiene promotion, record-keeping, tariff-setting and reporting.
- The Ministry of Irrigation and Water Resources, possibly in tandem with UNICEF, should be willing to support the salaries of an adequate number of educated staff at WES in Zalingei, Garsila and Kubum to manage a hand-pump maintenance activity.

- WES should be enticed back to re-open their Kubum office. This may involve joint-funding the salaries of staff and office space for a limited and pre-specified period of time. UNICEF in Nyala should be approached to obtain support and possible joint funding for this activity.



Figures 3 and 4. ACT/Caritas water tank (above) and tap-stands (left) at Khamsa Degaig camp, Zalingei. Note to feminists – sometimes men collect water too !!

7.6 OTHER INGOS

The other main international NGOs involved in WatSan in south Darfur include: Oxfam, CARE, World Vision, IRC, American Refugee Council, ACF, TEAR Fund (hygiene) and Solidarité.

In Zalingei, the other main INGOS in the WatSan sector are Mercy Corps and IRC. In Garsila, TEAR Fund, IMC and, to a lesser extent, ACTED and InterSOS are active. In both Garsila and Zalingei, ACT/Caritas's activities very effectively complement those of other INGOS in WatSan and do not duplicate them.

8 ACTIVITIES AND LOCATIONS – SUDO

8.1 OVERVIEW OF ACTIVITIES

Only two of the DERO partners are currently engaged in WatSan activities: ACT/Caritas and SUDO. There is currently little overlap between the organisations: ACT/Caritas's activities are undertaken largely from field offices in Zalingei, Garsila and Kubum. SUDO's activities are undertaken from Nyala and Ed Daein. SUDO have a small budget for drilling in Jebel Marra (via their Zalingei office) in 2007 but this has been indefinitely delayed due to government-imposed security restrictions. Formerly, SUDO in Zalingei have also worked closely with ACT/Caritas to provide sanitation facilities in the IDP camps.

The activities undertaken currently by SUDO in the field of water and sanitation within the DERO framework have all been funded by Belgian Caritas and implemented by SUDO since May 2007. This covers (according to Eng. Suleiman Ahamed):

- a. Rehabilitation of water yards, construction of c.200 latrines, 150 school latrines and refurbishment of 50 latrines in the Ed Daein area.
- b. A variety of activities in the IDP communities in southern Darfur (around Nyala), to include 10 boreholes (drilled with the ACT/Caritas rig) with hand-pumps.
- c. A programme to drill 10 boreholes (drilled with the ACT/Caritas rig) in upper Jebel Marra to the north of Zalingei, equipped with hand-pumps.

Historically, SUDO's WatSan work within the DERO framework has covered the following:

- d. Mershing Camp (75 km north of Nyala). Provision of 6 boreholes with hand-pumps, sanitation, hygiene promotion, vector control (spraying), solid waste collection. Status: Ongoing – see below.
- e. Al Malam camp (vicinity of Nyala). Status: Work terminated due to security issues.
- f. Kalma Camp (vicinity of Nyala). Drilled 5 boreholes with hand-pumps. Initiated WatSan committees in camp. Status: Boreholes handed over to WES and IDP committees for maintenance and chlorination activities. Many other NGOs currently work in this camp, including IRC, CARE, WES, ACF and Spanish Red Cross.
- g. Bilel Camp (vicinity of Nyala). SUDO have camp management responsibility. SUDO have drilled 8 hand-pumps in the camp and 4 in the host village. Two mechanics have been trained to maintain these pumps. SUDO responsible for provision of spare parts. IRC also work with WatSan in the camp. Status: Ongoing – WES not present in camp.
- h. Kass area (NW of Southern Darfur). 7 boreholes with hand-pumps installed in villages. 150 household latrines rehabilitated. Status: ??
- i. One borehole drilled and equipped with hand-pump in Haiar Riyad area of Nyala for IDPs without water.
- j. Sunta, Wazazeen, El Neem and Khour Omer IDP camps, Ed Daein. Latrine rehabilitation, solid waste disposal, vector control (WES provide water supply). Provision of 7-day hygiene promotion workshops for community hygiene trainers, workshops run by MoH staff. Status: Ongoing
- k. Rehabilitation of 7 water yards outside of Ed Daein since 2005. These typically comprise a deep motorised borehole, elevated storage and distribution to separate points for humans, tankers and livestock. Water is sold at a rate of 0.1 SuP per jerry can and revenue is collected by the operator (WES or SWK – who employ the yard "caretaker" - together with host community). Status: Handed over to WES.
- l. One new water yard with a 815 ft borehole constructed in the Nubian Sandstone near Ed Daein, operating at 8500 gal/hr 8 hrs/day, constructed in 2006. Status: Reported to be complete and handed over to WES

8.2 SOUTHERN DARFUR (MERSHING CAMP)

8.2.1 Overview of Activities - Mershing

Of the SUDO activities in Southern Darfur, time constraints and security restrictions (Al Malam, Kalma and Bilel camps being restricted or requiring security clearance), only Mershing Camp could be visited.

Mershing IDP camp is a complex of 9 sub-camps containing in total 39,000 IDPs. It is located around the village of Mershing, some 75 km north of Nyala. SUDO has had a WatSan activity in three of the sub-camps: Um Gozen, Hashaba and Ton Qitr, although these are all managed from the SUDO health centre in Um Gozen.

Um Gozen contains around 7000 IDPs. The SUDO health centre employs a pharmacist and medical assistant (both male), 6 other staff (male, largely medical), a midwife, a guard and a cleaner. SCC and World Vision also have activities within Um Gozen, but no systematic coordination exists. The entire sub-camp is served by 3 hand-pumps (2300 people per hand-pump – almost 5 times below the SPHERE guideline). SUDO report that there were plans to drill another two hand-pumps but these plans are on hold due to security concerns regarding the ACT/Caritas rig. The three hand-pumps (plus the one in Hashaba and the two in Ton Qitr) are managed by a water committee, which was apparently “selected” by SUDO and comprises 8 men and 2 women. The committee was given 7 days’ training in PHAST methodology and hand-pump maintenance.

The three hand-pumps at Um Gozen were drilled to 30 m depth in 2004 by WES and already after 3 years the concrete surrounds require rehabilitation. Drainage is rather poor around some of the hand-pump and, not surprisingly, queues of up to 1 hour are reported some mornings (again in violation of SPHERE guidelines). Some IDPs prefer to draw water from dug wells in the wadi.

Latrines have evolved into a situation where most household have their own latrine, but following the rainy season, SUDO plans to assist with rehabilitation of collapsed latrines.

As regards hygiene promotion, the health centre's pharmacist conducted a 3 month workshop in 2006 for 48 IDPs from throughout Mershing (10 delegates from Um Gozen; 50% men, 50% women). The course covered house-nursing and first aid in addition to hygiene promotion. The delegates were chosen on the basis of literacy and representativity from the original village. It is not wholly clear what these delegates are now doing within Mershing, although it is claimed that they sometimes teach hygiene messages at the schools.

The pharmacist claims that the state of health in the camp is “poorer than normal” and that the main diseases observed at the clinic are malaria, dysentery, intestinal worms and skin complaints. He was unable to provide statistics on these (though claimed that they had been sent to Nyala) and could not demonstrate the impact of hygiene promotion campaigns.

In Hashaba sub-camp, SUDO have drilled (via WES in 2004) a single hand-pump. Otherwise, World Vision provide a water supply via a motorised well and tap-stands, and via 5 other hand-pumps. World Vision have their own committee to manage these wells.

In Ton Qitr sub-camp, the sole source of protected water is SUDO's two drilled boreholes (by WES in 2004). These are located between 150-200 m from the current IDP area. On visiting these hand-pumps, they were found to be broken (and had been for at least 1 week). No message regarding this had been provided to SUDO or the responsible water committee in Um Gozen. SUDO do not know the numbers of IDPs in Ton Qitr, but they are likely to be at least 2000-3000. The number of hand-pumps is thus well below the SPHERE standard.

In summary, the water supply aspect of SUDO's work in Mershing is significantly below the SPHERE guidelines in terms of numbers of water points. The hygiene promotion activities, at least as described to the author, have no clear programme, monitoring or follow-up.

8.2.2 Technical and Organisational Capacity

SUDO's capacity is discussed in Chapter 7.

8.2.3 Phase-out / Handover Plan

The activities at Mershing have not reached a standard where they can be handed over to WES (who would be the natural inheritor).

The hygiene promotion programme is currently not coherent enough to be handed over to MoH. Moreover, MoH have not the capacity to manage such a program without extensive support from the NGO community.

The single borehole at Hashaba (Mershing) should be formally handed over to World Vision (who already maintain 5 similar hand-pumps in Hashaba).

SUDO's activities in Kalma have reportedly already been handed over to WES.

It would be the ultimate objective to hand over SUDO's activities in Bilel and Kass to WES in the long term. It is unclear whether WES is present in these areas and, if not, whether this is due to lack of capacity or lack of security.

8.2.4 Capacity Building

See Chapter 11

8.2.5 Recommended Future Action

- Joint ACT/Caritas / SUDO / IRC and WES assessment of Bilel Camp to ensure compliance with SPHERE guidelines and to draft plans for medium-term handover of responsibility (if any). Timeline: Dec 2007
- Handover of single borehole in Hashaba to World Vision for ongoing maintenance and management. Timeline: Dec 2007
- Installation of additional water supply points in Um Gozen to ensure SPHERE compliance in terms of quantities supplied and number of delivery points. Timeline: Feb 2008.
- Joint ACT/Caritas and SUDO assessment and mapping of WatSan needs in Ton Qitr and installation of additional water supply points in Ton Qitr to ensure SPHERE compliance in terms of quantities supplied and number of delivery points. Mobilisation, training and provision of tools to a separate water and hygiene committee in Ton Qitr. Timeline: Feb 2008.
- KAP survey and development of a program for implementation and monitoring of hygiene promotion activities within Um Gozen. Timeline: Dec 2008.
- Review of reasons for lack of representation of women within SUDO's camp staff and within water / hygiene committees. Timeline: Dec 2008.



Figure 5. A typical DERO borehole, fitted with an "India" hand-pump. This was installed by SUDO at Um Gozen IDP camp, Mershing.

9 ACTIVITIES AND LOCATIONS – ACT/CARITAS

9.1 OVERVIEW OF ACTIVITIES

Only two of the DERO partners are currently engaged in WatSan activities: ACT/Caritas and SUDO.

ACT/Caritas operate two PAT301T drilling rigs on behalf of DERO. These rigs are in fairly continuous activity serving SUDO's (Chapter 8) and ACT/Caritas's WatSan programs. ACT/Caritas's water program is implemented via field offices in Zalingei, Garsila and Kubum. Kubum was not visited as part of this assessment, but is discussed briefly in Chapter 11.

9.2 ZALINGEI

During September 2007, the author was only able to view and assess activities in Zalingei town, due to security restrictions.

9.2.1 ACT/Caritas in Zalingei

Zalingei is a town of around 50,000 residents in Western Darfur state. This has been supplemented by an IDP population of around 120,000 (M Mpitapita, pers. comm.).

Within Zalingei, three main INGOs are involved in WatSan activities – ACT/Caritas at Khamsa Degaig (13,450 IDPs) and Taiba (5,400 IDPs) camps, Mercy Corps at Hassa Hissa and Taiba camps and IRC (supplemented by ACT/Caritas) at El Hammidiya camp (40,500 IDPs).

In the initial development of the camps, communal latrines were provided on the basis of SPHERE standards (1 latrine per 20 persons). As camps have matured, IDP residences have become more permanent, with adobe walls and adobe enclosures around compounds. A move towards household latrines has accompanied this, sometimes with former communal latrines being enclosed by IDPs as household latrines. This has, of course, significantly increased the demand for sanitation services.

The recent influxes of IDPs have overwhelmed designated camp boundaries to the extent that the border between residents and IDPs may be very diffuse. ACT/Caritas's Field Coordinator is of the opinion that free WatSan services have been needed to be provided within the host community to avoid potential conflicts over access to services.

The activities undertaken currently by ACT/Caritas in the field of water and sanitation in Zalingei are supported by ECHO (fourth funding round), running until December 2007:

- a. Water supply in Khamsa Degaig, Hammidiya and Taiba IDP camps around Zalingei town, integrated with sanitation provision (except in Taiba) and hygiene promotion, vector control and solid waste.
- b. Water supply and hygiene promotion in farming villages hosting smaller IDP communities, such as Rukum and Abata, around 30 km from Zalingei.
- c. Potable (non-livestock) water supply (drilling plus hand-pump) and hygiene promotion at nomadic damras (villages), near Treij, about 30 km from Zalingei.
- d. Water supply (drilling plus hand-pump), hygiene promotion and schools latrines in the lower Jebel Marra area, east of Zalingei: Nertiti town and IDP camps, Tur, Golol and Warana (villages with IDP communities).
- e. Drilling and equipping boreholes with hand-pumps within Zalingei town in response to requests from town communities. School latrine and hygiene promotion programs in Zalingei schools.

Box 9.1: Why are we working in damras and village communities?

It may seem curious that ACT/Caritas is working in nomadic Arab villages such as Treij or Dagul Fatr (see Garsila), or in farming villages with no IDPs, such as Mindo (see Garsila). This seems more like rural development work than emergency work.

The reasons that field coordinators give for choosing to engage in such projects include:

- Peacebuilding. Equitable provision of services to Arab nomads (e.g. Dagul Fatr) as well as to fur IDPs.
- Security. It has been suggested to INGOs that attacks on vehicles on certain roads would become safer if water was provided to villages or damras en route. One word for this is security – another is extortion!
- Aggression against villages. Concern that villages and damras, while not IDPs, are still conflict affected. According to staff in ACT/Caritas Zalingei field office, the semi-nomads of Treij are apparently paying protection money to other Arabic aggressors to be allowed to remain. It is further alleged that the existing hand-pumps have been destroyed by the same aggressors, who are now selling water to the damras of Treij.
- Returnee potential. The desire to provide services to villages from which IDPs have been displaced (e.g. Mindo) in order to provide incentives to returnees and to support those farmers who have chosen to risk remaining.

All these arguments are logical and more or less powerful. It must be the decision of the Field Coordinator (with experience of a local perspective) and Program Manager to weigh up the risks and benefits of such rural water supply projects. I would, however, caution ACT/Caritas to consider deeply before embarking on projects of this nature. ACT/Caritas's drilling potential far outstrips its potential to build effective hand-pump management. We are in danger of accumulating responsibility for a mass of several hundred unmaintained boreholes and hand-pumps, which will ultimately be unsustainable and which will fall into disrepair over the course of a few years.

There are four main IDP camps in Zalingei, with different INGOs having overall responsibility for WatSan.

- Khamsa Degaig camp (13,450 pop.), with ACT / Caritas responsible for WatSan, and contributions from Mercy Corps for hygiene promotion.
- Hassa-Hissa and Shabbab camps, where Mercy Corps have overall responsibility (no involvement from ACT/Caritas).
- Taiba camp (for 5,400 Arabic peoples displaced in 2006 as a result of inter-Arab conflict), where Mercy Corps have overall WatSan responsibility, but with some input from ACT/Caritas.
- Al Hammidiya camp (40,500) where IRC have overall WatSan responsibility, but with some input from ACT/Caritas.

9.2.2 Zalingei Town Borehole and Schools Latrines

ACT/Caritas has been engaged in the drilling of boreholes for groups of town (host) residents, at their request. The FC believes that this is necessary to avoid friction between IDPs and residents and one must respect this opinion due to his long experience within Zalingei and an "ear to the ground". As an outsider, this author finds the practice of providing free hand-pumps (with no maintenance tariff) to a host community who are presumably able to pay for water, troubling (Box 9.2). Three such hand-pumps were visited and one (named Hassa-Hissa Host Community East, despite being around 1.5 km from the IDP camp of this name) was clearly malfunctioning. The Water Committee associated with this hand-

pump had not reported the failure to ACT/Caritas and still less had taken any steps to repair the hand-pump themselves. They clearly regarded the hand-pump as ACT/Caritas's.

- There are some signs that the obligation to develop and empower responsible water committees for the maintenance of new hand-pump developments in Zalingei town is not being emphasised sufficiently by ACT/Caritas. The result is ACT/Caritas acquiring yet another ongoing commitment to maintenance of non-emergency installations. While recognising that an engagement with the host community is essential and that provision of some benefits is desirable, ACT/Caritas should review its practice of drilling for townsfolk "on request" and should further review its reluctance to introduce a maintenance tariff or financial contribution from the community. Furthermore, consideration should be given to whether adequate time and resources are expended in mobilising a responsible water committee that can take responsibility for ongoing maintenance. Could WES be involved to a greater extent in this activity?

Box 9.2: In Zalingei, people willingly pay 0.5 SuP (\$0.25) for two 20L jerry cans of water, drawn from a dug well in a wadi and served from a donkey-drawn tanker...

Why are ACT/Caritas providing clean groundwater from hand-pumps free of charge?? Are we undercutting the legitimate business of the donkey-tankers? Might they even take revenge by sabotaging hand-pumps?

Even WES in Nyala requires communities requesting drilled wells to pay 3% of total project costs for a geophysical survey and to organise a regular tariff to cover spare parts.

Any mechanized pump, whether it be motorized or a hand-pump, requires maintenance and spare parts. In other words, it costs money to run. Townspeople and rural nomadic and farming families often have money and are (given a lack of alternatives and of gullible NGOs!) willing to spend it on water for drinking and watering livestock (Banks 2008).

The life of a hand-pump in Darfur, before it requires maintenance, is often between 6 months and 3 years. If no tariff is collected from the users, the implementing NGO remains responsible for maintaining the well and bears the cost. In other words, the well is unsustainable (economically) as it is dependent on external inputs and the NGO has no exit strategy.

- Where a hand-pump is being provided to (a) townspeople, (b) nomadic or farming villages where the IDP "load" is not overwhelming and where income is generated, ACT/Caritas should consider whether a community financial contribution is appropriate and should encourage the water committee set a tariff for users, to generate income to maintain the well.

Clearly, in (a) IDP camps and (b) host villages with a large IDP "load", it is unrealistic to request monetary contributions from users. But this leaves ACT/Caritas with an ongoing and indefinite commitment to maintain water points in that community, and with narrowed possibilities for exit strategies while IDPs remain.

As a parting comment – we note that in Khamsa Degaig and Al Hammidiya camps, individuals have set up generators and electricity networks and are selling electricity to some IDP households. Clearly, some of the IDP community have the money and willingness to pay for public utility services!

Furthermore, within Zalingei town, ACT/Caritas has constructed blocks of ventilated pit latrines at several schools. Plans exist provide water for hand-washing, either by connecting to the limited town water distribution network or by drilling boreholes nearby. In one case (Abu Bakr school), a borehole has been drilled (on the evidence of a geophysical survey) at around 150 m from the latrines. If the yield

is adequate, a solar powered water pump may be an effective solution for providing water to the school and its latrine blocks.

9.2.3 Khamisa Degaig IDP Camp

On visiting Khamisa Degaig camp, it becomes clear why the townspeople of Zalingei might resent the services provided to the IDP community and request similar services from ACT/Caritas (see above). Khamisa Degaig is the best WatSan programme that I have seen executed within a refugee or IDP camp by ACT members: the teams that have worked to achieve this should be wholeheartedly congratulated. The sources of water are as follows:

- Well No. 4. A 9 m deep x 3 m diameter well, dug in 2005 near the wadi plain/bedrock interface. This well fills a 45 m³ Oxfam-type steel tank on a nearby hill, where the water is chlorinated and (following 30 minutes reaction time) distributed to 6 tap-stands (each of 6 taps). The tank is filled 3 times per day in the rainy season and 5-6 times per day in the dry season. Water supplied = minimum 135,000 L/d.
- Dug Well near Aribu School. A 13 m deep x 2.5 m diameter dug well, supplying an adjacent 10 m³ elevated bladder (where water is chlorinated), in turn supplying one tap-stand. The bladder is filled 3 times per day, representing a further 30,000 L/d.
- Dug Well near Nutrition Centre. A 9 m deep x 2.5 m diameter dug well, supplying an adjacent 20 m³ elevated bladder (where water is chlorinated), in turn supplying two tap-stands. The bladder is filled 2 times per day, representing a further 40,000 L/d.
- A further dug well, where water can be accessed by a bucket (not viewed)
- 7 drilled boreholes with hand-pumps. At each well, chlorinators are present from 6 am to noon and from 3 pm to 6 pm. Chlorine "mother" solution is added by syringe to each jerry can, according to jerry can size.

The water from the pumped wells is all chlorinated in the tank, and left to react for 30 mins. prior to distribution. Levels of chlorine are tested (in the case of Well No. 4, tests are carried out in the tank, in the taps and in the household). Microbiological tests (with the Del Agua test kit) are carried out on raw well water 2-3 times per month. In most cases, wells and boreholes are drilled near the interface between the wadi plain and the mica schist rock hillside. In no cases was conflict between wells and pollution sources (latrines) noted. In all cases (even hand-pumps) records of water quantities supplied are kept. At one hand-pump, between 500 and 700 L/d of water was supplied. Questioning of water users revealed no serious concerns over waiting times for water. Water was supplied from taps at acceptable pressures and rates. The camp is well covered with no unacceptable distances between water points and user households. The quantity of water supplied is estimated to be greater than 205,000 L/d, equating to approximately 15 L/d (the SPHERE guideline). Questioning of women collecting water at tap-stands confirm that they collect 10-15 x 20 L jerry cans per day per household (which may be up to 10 members). The number of taps present is estimated as 54 (plus hand-pumps), representing 249 users per tap (SPHERE guideline 250).

On initial settlement in 2004, latrines were provided as communal facilities. Over time latrines have been enclosed and there has been a clear tendency towards household latrines. ACT/Caritas provides reinforced concrete slabs (constructed in the camp by paid artisans). A recent survey by ACT/Caritas suggests that only 170 households now lack a household latrine. Those without may share a neighbour's latrine or use a communal facility. ACT/Caritas is currently working to provide facilities for the 170 lacking households, but is also working with repair of latrines damaged in the rainy season.

Meetings were held with the group of hygiene volunteers (7 persons of whom 3 women and 4 men) and the water committee (9 persons of whom 3 women and 6 men – none of the women were present at the meeting). The groups were appointed by sheikhs in the camp and cannot necessarily be considered representative. The two groups saw their work in very practical terms: scolding children for playing with taps; visiting households to check that water is stored safely; visiting schools to check children wash their hands; resolving conflicts over water use and organising solid waste disposal. There was no emphasis on maintenance on hand-pumps. Later on the hygiene group mentioned provision of hygiene

education sessions to groups of around 30, using visual aids provided by ACT/Caritas. ACT/Caritas's own hygiene workers provide curricular training at camp schools. The hygiene group mentioned difficulties in interesting people in hygiene issues in house visits. Mercy Corps apparently also have hygiene promoters working in the camp, but they also distribute soap on a monthly basis and find it consequently much easier to initiate discussions during home visits.

As regards vector control, mosquito nets were distributed by ACT/Caritas at a rate of 1 per household. Spraying of outside areas for insect control is carried out at 5-monthly intervals.

9.2.4 Taiba Camp

At this camp, Mercy Corps have arranged for the Zalingei Water Corporation to supply water from their system (ultimately derived from wells near the wadi) to two 30 m³ Oxfam type storage tanks. Here, water is chlorinated and distributed to 3 tap-stands (of 6 taps) at a rate of 60,000 L/d. ACT/Caritas have agreed to supply 10 drums of fuel per month to operate the pumps associated with the supply (450 SuP per drum) and to bear the cost of parts and oil. The per capita provision from this source is 11 L/d per person, 300 persons per tap. As this falls slightly below SPHERE standards, ACT/Caritas were also requested to construct 2 additional boreholes, with India hand-pumps in outlying regions of the camp. One of these has been commissioned (see cover photo), one will be fitted with a hand-pump pending results of chemical analysis. The water from the operational borehole is not being chlorinated (and it is unclear whether this will be done and, if so, by who). ACT/Caritas are regarded as being responsible for maintenance of these hand-pumps.

Sanitation in the camp is via poorly constructed pit latrines and there has been a history of dispute with the landowner (Ministry of Planning) as to whether such construction should be permitted. It seems likely that many of the IDPs still prefer to use the "bush" rather than latrines. ACT/Caritas has, however, no involvement here in provision of sanitation. Mercy Corps has a hygiene promotion activity here, but ACT/Caritas contribute with occasional inputs.

9.2.5 Al Hammidiya Camp

Al Hammidiya is large camp, subdivided into sectors. IRC has assumed an overall role for WatSan management. IRC operates an extensive water distribution network based on water pumped from wells in a wadi valley. ACT/Caritas has, however, been involved in most of the provision of sanitation which, like Khamsa Degaig, started by provision of communal latrines and culminated with the provision of reinforced slabs for household latrines. At present, 70% of households have their own latrines, and ACT/Caritas continues work to provide latrine material to the other 30% and to new arrivals. ACT/Caritas is also assisting households whose latrines have collapsed during the rainy season.

In Sectors 2 and 4, ACT/Caritas is providing potable water. This is sourced from a 5-7 m deep dug well, c. 150 m outside the camp and away from pollution sources. Two pumps are operated to deliver water to two 10 m³ pillow tanks (one at a low elevation near the well, serving the lower parts of the sectors, the other on a crest within the camp), where the water is chlorinated. Each of the pillow tanks is refilled twice per day, representing the delivery of 40,000 L water to the 5500 inhabitants of the two sectors via 18 tap-stands. This is below SPHERE guidelines but IRC also provide water to these two sectors from their own network. I am assured that this results in SPHERE compliance but have been unable to independently verify this. ACT/Caritas also works with the sectoral WatSan and hygiene committees in these sectors.

Additionally, at the request of IRC, ACT/Caritas have drilled 5 boreholes within the camp. Three have recently been installed with hand-pumps and two are awaiting installation. Two of the three functioning hand-pumps were visited. One was located in Sector 7 (new arrivals), a short distance outside the camp and away from pollution sources. A chlorinator employed by IRC was actively chlorinating jerry cans. The second was located within the camp: no chlorinator was present (whose responsibility is this?) and water was not draining freely from the pump apron, but accumulating in large puddles and ruts in the road. Moreover, two latrines have been constructed at distances of some 20 m from the hand-pump, apparently since the borehole was drilled. This borehole seems to be devoid of management and begs the question: who is responsible? ACT/Caritas or IRC?

9.2.6 Technical / Organisational Capacity

ACT/Caritas Zalingei maintains a Water and Environmental Engineering Office staffed by an international Environmental Engineering advisor (Simon Odong), 3 technicians (2 men, 1 woman) and a Hygiene Promotion office with a staff of 5 (2 men, 3 women). I judge the unit to have excellent technical capability. This is undoubtedly aided by the fact that the office has a highly capable field coordinator with a background in WatSan Engineering.

The WatSan team have been highly efficient at constructing hand-pump facilities and sanitation facilities. They are running Water Supply and Sanitation in one camp (Khamisa Degaig) to an extremely high level and are contributing in two other camps. The major weakness in the operation is that the performance of the drilling rig far outstrips the current ability of the office to forming responsible and effective water committees for rural hand-pumps and for hand-pumps in Zalingei town. Currently, training of committees appears fairly minimal: tools and maintenance training are not clearly provided. No financial contribution is required from beneficiaries and committees are not encouraged to set a tariff to support maintenance and purchase of spare parts.

Hygiene promotion teams work with Water and Health Committees in the IDP camps, and with trained hygiene volunteers to communicate messages related to general health, hygiene and waterborne disease and HIV/AIDS. Materials from UNICEF and MoH are used, and the methodology is claimed to be broadly based on PHAST. On close questioning, however, the fact that PHAST is based on mutual recognition of harmful behaviours as a motivator for change was not clearly recognised. KAP surveys are claimed to have been performed every year during ECHO funding, but hygiene promotion teams are not in the habit of examining disease incidence statistics from clinics to ascertain the real impact of hygiene promotion.

The office appears to have adequate vehicles and communications equipment, although the water engineering staff could possibly benefit from improved computing facilities.

I would finally comment that the relative success of the WatSan provision at the Zalingei camps is likely in large part to be due to the good relationships between the principle NGOs and WES. In fact, every 3 months these NGOs carry out combined assessments of the camps to ascertain if they are meeting SPHERE guidelines and to plan remedial action.

9.2.7 Phase-out / Handover

Hand-pumps within Taiba camp should be formally handed over to Mercy Corps for ongoing maintenance and water-committee liaison.

Hand-pumps within Hammidiya camp should be handed over to IRC for ongoing maintenance and water-committee liaison.

The broader aspects of phase-out or handover of ACT/Caritas's operation are so general and far-reaching that they are dealt with in Chapter 11.

9.2.8 Capacity Building

The ACT/Caritas WatSan staff should attend workshops on (i) Environment and Monitoring of Water Resources; (ii) Water quality monitoring. This should include training in use of the DelAgua test kit and agreement on policy for microbiological testing of water. Staff should be provided with water level "dippers" to routinely monitor rest (prior to morning switch-on) and pumping (prior to evening switch-off) groundwater levels in pumped dug wells in Khamisa Degaig.

Consideration should be given to a refresher course on PHAST methodology for hygiene promotion staff. Further aspects of capacity building are dealt with in Chapter 11.

9.2.9 Recommended Actions

- At Khamisa Degaig and Al Hammidiya camps, raw water from all dug wells should be submitted for chemical analysis to ensure that it meets Sudanese water quality regulations. Timeline: Dec. 2007.

- At all three IDP camps, water from all hand-pumps should be analysed for microbial quality. In the light of these results, ACT/Caritas may wish to reconsider whether chlorination outside of the rainy season is strictly necessary. Timeline: Dec. 2007.
- NGOs seem to expend a lot of effort rehabilitating household latrines that have collapsed during rains. Design of latrines should be reviewed with the objective of making them more resistant to collapse during the rainy season. Moreover, it would seem that, for household latrines, the responsibility for repair or rehabilitation should dominantly be with the household not the NGO. ACT/Caritas and IRC should explore with WatSan committees the hurdle to households assuming a greater degree of responsibility in this respect. Timeline: Dec. 2007.
- When ACT/Caritas is drilling boreholes and fitting hand-pumps in camps for which it has not WatSan management responsibility, an agreement should be signed handing over the hand-pump to the managing NGO. In practice, I recommend that the two hand-pumps in Taiba be handed over to Mercy Corps and the five in Al Hammidiya be handed over to IRC. If necessary, ACT/Caritas should provide training to IRC/MC staff in hand-pump maintenance. Timeline: Jan 2008.
- WES, Mercy Corps, ACT/Caritas, SUDO and IRC should jointly develop a hand-pump spare parts centre in Zalingei. The initial expenditure could be shared between the organisations (or borne by ACT/Caritas) on the basis of a revolving fund, where parts are supplied to participating NGOs against payment for the part. Consideration should also be given to training and equipping two regional hand-pump mechanics who, against a fee, can repair damaged pumps. In the long term, this centre should be handed over to WES. Timeline: Spare parts centre initiated mid-2008.
- ACT/Caritas should enter into dialogue with IRC and the WatSan/hygiene committees to provide adequate drainage from new hand-pumps in Sector 7 of Al Hammidiya, to ensure that nearby latrines are adequately relocated and that a consistent policy of chlorination is adopted. Timeline: Dec. 2007.
- ACT/Caritas should ensure that WatSan committees in Khamsa Degaig and Al Hammidiya receive full training for hand-pump maintenance and that tools are lodged with an ACT/Caritas pump operator on site. Timeline: mid-2008
- UNICEF and Mercy Corps should be approached with a view to permitting ACT/Caritas's hygiene promoters to share in the monthly distribution of soap in Khamsa Degaig. It is hoped that this would prove a catalyst for discussions regarding hygiene behaviour. Timeline: Dec. 2007.
- The brick-clay excavations on the edge of the major IDP camps are accumulating both water and waste and will provide breeding ground for mosquitoes. When the clay pits are exhausted, they should ideally be backfilled with inert waste or, at the very least, sprayed on a systematic basis to control insects. Timeline: mid-2008.
- There may be a need for a refresher course for ACT/Caritas hygiene staff in Zalingei on the fundamental principles of PHAST. Furthermore, hygiene teams should be encouraged to develop closer links with IDP camp clinics to monitor the impact of hygiene promotion in disease incidence levels. Timeline: mid-2008.
- The WatSan programme for 2008 should focus closely on effective development of water committees to maintain hand-pumps. Outside of IDP camps, communities should be encouraged to set a tariff to cover parts and maintenance. In the case of new hand-pump projects, consideration should be given to whether communities should be required to make a financial contribution to the project. WES policy (Nyala) suggests a contribution of 3%, which would be \$150 or 300 SuP for a typical hand-pump project costing \$5000 USD.
- ACT/Caritas should complete the installation of hand-washing facilities at the school latrines as a matter of priority. To review the applicability of simple solar pumps as a technology for

providing modest quantities of water for hygienic purposes within the schools. Timeline: Apr. 2008.

9.3 GARSILA

9.3.1 Overview of Activities

Garsila was opened as a sub-office to ACT/Caritas's operation in Zalingei. It was upgraded to a full office with its own field coordinator in late 2005. By the end of 2006, DERO's strategic plan envisaged the shutting of the Garsila office, but a change of top management resulted in it being kept open due to the perceived high load of IDPs compared with, for example, Kubum (only around 6000 IDPs). The program of ACT/Caritas in Garsila was largely funded throughout 2005-06 by ECHO.

Box 8.3 Testing water wells

Newly drilled boreholes are test-pumped either by visual estimation during air-lifting or simply by placing a submersible pump in the bore and pumping for several hours to ascertain the yield. The better the test-pumping of a new borehole, the better the characterisation of the source and the more reliably and sustainably it can be managed and operated. In fact, Bromwich et al. (2007) call for somewhat more sophisticated test-pumping methods to be employed to quantify the water available from a new source. Such methods are available, and are published by MacDonald (2006) and Misstear et al. (2007) and do not necessarily require greater field input than existing methods.

All newly drilled boreholes fitted with hand-pumps are required to be chemically analysed to ensure that they comply with Sudanese water quality legislation. Thus, following drilling (but before fitting with a hand-pump), ACT/Caritas typically submits a sample of water to the State Water Corporation Laboratory (supervised by WES), where it is analysed for: Colour, turbidity, pH, electrical conductivity, odour, taste, total dissolved solids, total hardness, alkalinity, HCO_3^- , CO_3^{2-} , Cl^- , Fe , F^- , NO_3^- , NO_2^- , NH_3 and As. According to Babiker Ibrahim, around 10% of analyses from boreholes in Zalingei are non-compliant (typically due to fluoride and nitrate) and hand-pumps are not fitted.

Intriguingly, there seems to be no obligation for chemical analysis of water from dug wells (although ACT/Caritas should also arrange for such analysis as a matter of good practice), nor for microbiological analysis of any well or borehole (remarkable, given that this will always be the main water quality risk). Following hand-pump installation, ACT/Caritas may perform a microbiological analysis using the Oxfam-DelAgua water test kit, but this does not seem to be done regularly or systematically. Staff note difficulties in obtaining supplies of consumables including nutrient medium.

In times of cholera risk, UNICEF may also distribute rapid assessment kits for microbiological analysis. These provide a gross indicator of contamination and are reportedly based on a colour change due to sulphide generation.

- ACT/Caritas should acquire groundwater level "dippers" for drilling staff and train them in appropriate test pumping procedures, such as those recommended by MacDonald (2006) and Misstear et al. (2007).
- ACT/Caritas should develop a framework for systematic microbiological testing of all groundwater sources using the DelAgua kits. It should also regularly monitor microbiological quality of wells and hand-pumps within IDP camps to demonstrate SPHERE compliance (which requires the absence of faecal coliforms). A system should be established for procurement and supply of consumables to field stations.

The 2007 programme is funded by British DEC to provide water and sanitation within IDP camps and villages in the Garsila area. The Garsila office is engaged in the following activities:

- Water, sanitation, community mobilisation/hygiene promotion in three camps: Daba Camp in Garsila town (around 30,000); Deleig camp (26,000 IDPs and 6900 host villagers: 25 km NE of Garsila) and Um Kher camp (10-12,000 IDPs, about 40-50 km west of Garsila).
- Provision and maintenance of 6 drilled boreholes with hand-pumps in Garsila town. Mobilisation of water committees.
- Provision of at least 66 boreholes in villages and in the Wadi Saleh region. These are often not villages with large numbers of IDPs but are either villages from which IDPs were displaced (and may hope to return) or nomads' damras (boreholes drilled for peace-building purposes). Community mobilisation and hygiene promotion at these localities.

Four sites were visited by the consultant to view the status of these activities:

- Deleig Camp and Village
- Dugul Fatr nomadic damra - borehole hand-pump
- Mindo village
- Daba Camp

9.3.2 Deleig IDP Camp

Deleig lies on sloping weathered granitic terrain near to a major wadi. Several side wadis cut through the area. The population is estimated as around 33,000: 26,000 IDPs and 6900 villagers.

ACT/Caritas is the main NGO involved in water in the camp. TEAR Fund and IMC have contributed to sanitation and, to a lesser extent, water supply infrastructure. Some of the initial wells and boreholes were sunk by WES or MSF, who are now not present in the camp. Water is currently supplied by the following elements:

- a 47 m deep "Central" borehole near the wadi, filling a lower level 10 m³ bladder (with two 6-tap tap-stands) twice per day and a high level (Salaam Camp) 10m³ bladder four times per day (also two 6-tap tap-stands). Total supplied 60,000 L/d
- Four dug wells near the wadi (and also nearer the host village), each pumped to a 10 m³ bladder serving two 6-tap tap-stands). Each is filled 2-3 times per day. Total supplied c.100,000 L/d.
- 7 "effective" hand-pumps and 9 "effective" open wells each providing a nominal 10,000 L/day (500 jerry cans). A well that dries up in the dry season may only be counted as part of an effective well. Total 160,000 m³.
- A dug well, with one 15 m³ and one 5 m³ bladder, serving five six-tap tap-stands in the market. The system was initially constructed by MSF, handed over to IMC and now partially handed on to the community. This currently supplies only 40,000 L/d but has a much higher capacity and used to supply more prior to handover.



Figure 6. Open dug well at Deleig camp.

The water from the bladders is chlorinated within the bladders. The ACT/Caritas site water engineer (Khalid) is responsible for checking levels of chlorination in the ACT/Caritas bladder/tap-stand systems on a daily basis. No chlorination is carried out at hand-pumps or dug wells.

The ACT/Caritas bladder systems are managed by the community via water committees, although ACT/Caritas provide maintenance services (Khalid, the resident engineer) and fuel. The pump operators are paid by the committees, although ACT/Caritas provide 120 SuP per operator per month to the committees for this purpose.

The Market Bladder system has been handed over to the community by IMC. The "community's" responsibility seems to have been taken over by the Locality (the local government), however. Currently, two-thirds of the operator's salary (150 SuP per month) and fuel costs are paid by the Locality and one third by IMC. The pumped quantity has dropped significantly (it would be interesting to ascertain if it has declined by two-thirds!) since handover and it is rumoured that the Locality are angling for another NGO to take over responsibility for the system.

The system thus yields an estimated total water supply of 360,000 L/d (11 L/pers/day based on a population of 33,000). Pumping records for June 2007 (Act/Caritas 2007b) suggest that the ACT and IMC bladders together actually supplied 236,000 L, giving a total of 396,000 L (12 L/pers/day).

The total number of water points are 102 taps, 7 hand-pumps and 9 wells. According to SPHERE guidelines, these should be adequate for 32,600 people. Thus, on paper, the system comes close to satisfying SPHERE standards in terms of water supply. However, currently, only the minority of the water is supplied at the upper (Salaam) part of the camp, where the majority of IDPs live. The water supply at Deleig can thus not be said to satisfy the spirit of the SPHERE standards.

ACT/Caritas are aware of this and have a plan (and 2007 funding) to rectify the situation by:

- Installing an additional pump at the IMC Market dug well and a supply line to a 45 m³ storage tank at "Deleig Central" (this steel Oxfam-type tank is already erected).
- From Deleig Central, additional pumping capacity to two additional 20 m³ steel mesh tanks in the upper (Salaam) part of the camp, with distribution to tap-stands near to the mesh tanks.
- Closure of the four bladder tank systems near the wadi in the lower part of the tank and replacement with 8 new hand-pumps mounted on the dug wells / boreholes currently supplying the bladders.

ACTED also has plans to develop a system based on an elevated tank at Deleig.

As far as water quality is concerned, the pumped dug wells are open and vulnerable to contamination. The non-pumped dug wells are likewise vulnerable and are also in some cases missing a concrete apron and suffering from poor drainage around the well. The hand-pumps have all been subject to chemical analysis, but the dug wells not. No well is systematically analysed for microbiological parameters. There is a tacit assumption that the dug wells are vulnerable to microbiological contamination, which is in contravention of SPHERE guidelines.

Sanitation in Deleig is based on household latrines: ACT/Caritas only became involved in sanitation when the immediate emergency had passed and there has not been any ambition to develop communal latrines. In terms of sanitation, ACT Caritas have provided materials for 795 household latrines. TEAR fund and IMC have also been active and a recent survey suggested that 40% of households have latrines. The other 60% are believed to either share neighbours' latrines or use the "bush" for defaecation. In 2007, ACT/Caritas, TEAR Fund and IMC have funds for 1200 latrines in the Garsila area. It is likely that around 700 will be constructed in Deleig this year.

As far as hygiene promotion is concerned, paid hygiene workers within the camp were disbanded at the end of 2005 financial year (lack of funding pending proposed closure of Garsila field office in 2006). ACT/Caritas's community mobilisers have some hygiene-related activities in the camp but they appear somewhat piecemeal (rather than a coordinated programme), and focus on practical measures such as planning for chlorination in the event of a cholera epidemic, solid waste campaigns and jerry can cleansing.

9.3.3 Daba IDP Camp (Garsila)

Daba camp lies on sloping weathered granitic terrain immediately north of a wadi on the north side of Garsila. A "host" community reside around and to the south of the wadi. The camp is bisected by the Zalingei road. It contains a total of 30,000 IDPs and is divided into 3 sub-camps:

- the Ardeba sub-camp is located to the west of the Zalingei road. It is perhaps best supplied with water of all the sub-camps. Around 110,000 L/d are provided to around 10,000 IDPs (11 L/pers/day). The available water points are sufficient for $(24 \times 250 + 4 \times 500) = 8000$ IDPs, according to SPHERE guidance. The water system comprises:
 - A borehole immediately north of the wadi supplying two 10m³ bladders, each with two tap-stands; one in the lower part of the camp by the borehole, the other in the upper (northern) part of the camp. The borehole works from 7 am and each bladder is filled around 3 times per day. The bladders typically take 2 hrs to fill and are emptied in around 1 hr. This implies that the yield of the borehole is c.1.4 L/s. The total number of taps is 24 and the total water supplied is around 60,000 L. In fact, June 2007's bladder filling records indicated an average of 70,333 L/day (ACT/Caritas 2007b).
 - four "effective" boreholes with hand-pumps, providing a nominal additional 40,000 L/day.
- the Jedda sub-camp is located immediately to the east of the Zalingei road. It is perhaps worst supplied with water of all the sub-camps. Around 40,000 L/d are provided to around 10,000 IDPs (4 L/pers/day). The available water points are sufficient for $(12 \times 250 + 1 \times 500) = 3500$ IDPs, according to SPHERE guidance. The water system comprises:
 - A borehole south of the wadi in a host village named Debe Gozo. This supplies a 5 m³ bladder with one tap-stand for the host village. Water is also pumped up into the camp north of the wadi to a 10 m³ bladder with 2 tap-stands. The upper bladder is filled four times per day (40,000 L) and the Debe Gozo bladder three times (15,000 L). Bladder filling records for June 2007 show a yield from the upper bladder of only 30,000 L (ACT/Caritas 2007b).
 - one "effective" borehole with hand-pump, providing a nominal additional 10,000 L/day. The long queues of >1 hours (up to 15 people queuing) testify to the overall inadequacy of the supply in Jedda.
- the Jabaleen sub-camp is located to the east of Jedda. Around 80,000 L/d are provided to around 9,000 IDPs (9 L/pers/day). The available water points are sufficient for $(12 \times 250 + 5 \times 500) = 5500$ IDPs, according to SPHERE guidance. The water system comprises:
 - A borehole located immediately north of the wadi in a host community area. This supplies a 5 m³ bladder with one tap-stand for the host village. Water is also pumped up towards the north into the camp, to a 10 m³ bladder with 2 tap-stands. Both bladders are filled 2 times per day in the rainy season (30,000 L) and (reportedly) 3 times per day in the dry (45,000 L). Bladder filling records from June 2007 record an average supply from the upper bladder of 29,667 L/day (ACT/Caritas 2007b).
 - five "effective" boreholes with hand-pump, providing a nominal additional 50,000 L/day.



Figure 7. Queues for water at the upper bladder at Jedda sub-camp, Daba camp, Garsila.

ACT/Caritas is the main NGO involved in water in the camp. TEAR Fund have contributed with sanitation.

The water from the bladders is chlorinated within the bladders during filling (which typically takes 1 hour for 5 m³ bladders and 2-3 hours for 10 m³/bladders). It seems that boreholes are typically pumping at a rate of 1.4 L/s. The author strongly suspects that the diameter of the borehole limits the size of pump that can be installed, and that this is the limiting factor for water supply in the camp. George Wambugu suggests, however, that in the dry season the boreholes for Ardeba and Jabaleen tend to run low on water. The ACT/Caritas water engineer (Mustafa) is responsible for checking levels of chlorination in the tap-stands on a daily basis. No chlorination is carried out at hand-pumps.

The ACT/Caritas bladder systems are managed by the community via water committees, although ACT/Caritas provide maintenance services (Mustafa, the responsible engineer) and fuel. The pump operators are paid by the committees, although ACT/Caritas provide 120 SuP per operator per month to the committees for this purpose.

The water supply at Daba Camp cannot be said to satisfy SPHERE standards. ACT/Caritas are aware of this and have a plan (and 2007) funding to rectify the situation by:

- Pumping of the best (Debe Gozo) borehole during the night. If capacity is insufficient, drilling of additional pumped boreholes). Pumping of water during night from Debe Gozo to new 45 m³ steel storage tank near Ardeba borehole.
- Daytime release of water from 45 m³ storage tank into supply line of Jedda system.
- Additional 23m³ mesh tank near Jedda bladder. From here water will be pumped to
- A further additional 23m³ mesh tank in the uppermost part of Jedda camp.

This scheme will provide an additional 90 m³ of storage available to Jedda (and Ardeba) camps. It will also provide no more than 20,000 m³ of water (via night time pumping) to Jedda (and Ardeba). It will provide additional tap-stands in Jedda but not in Ardeba. It will not improve water supply or tap-stand access in Jabaleen.

It is concluded that, while the 2007 planned improvements will increase the water supply to Jedda camp, it will not raise any of the sub-camps up to full compliance with SPHERE standards.

The hand-pumps have all been subject to chemical analysis. In fact, some drilled wells in the area between Jedda and Jabaleen had to be abandoned to high fluoride concentrations (2-3 mg/L) according to Sudanese regulations. One can question how relevant this standard is to refugee camps, where an inadequate supply of water is likely to have far greater health implications than the low risk of discolouration of teeth resulting from elevated fluoride levels. No well is systematically analysed for microbiological parameters.

Sanitation in Daba camp is based on household latrines. In terms of sanitation, ACT Caritas have not constructed household latrines: this has been TEAR Fund's area of operation. No good figures have been made available to ACT/Caritas but the water committee and sheikhs in the camp suggest that household latrine coverage may be around 40%. In 2007, ACT/Caritas, TEAR Fund and IMC have funds for 1200 latrines in the Garsila / Deleig / Um Kher area. It is unclear how many will be constructed in Daba.

As far as hygiene promotion is concerned, ACT/Caritas maintains a community mobiliser (hygiene worker) in each of the three sub-camps. Two of these are women and this appears to be reflected in the composition of the WatSan and hygiene committees (at Jabaleen: WatSan committee = 6 women and 5 men; hygiene committee = 15 men and 15 women). The hygiene promotion programme seems far more systematic in Daba than Deleig, with both workshop and practical aspects.

9.3.4 Um Kher IDP Camp

Um Kher lies around 40-50 km west of Garsila, near the town of Weigo. It has not been visited by ACT/Caritas staff since May 2007 due to poor security on the road (and was not visited by the author of this report). ACT/Caritas are responsible for WatSan at the camp (which is believed to contain 10-

12,000 persons). The camp (ACT/Caritas 2007b) is believed to contain 12 hand-pumps and 6 open wells (nominal yield of 180,000 L/d). It also contains two 10 m³ bladder systems (each with two tap-stands) based on motorised dug wells (June 2007 filling records suggest a yield of 42,000 L/d – ACT/Caritas 2007b). Members of the camp are able to visit Garsila to collect fuel and tools to maintain the system. A supposed total yield of 222,000 L/d (19 L/pers/day) appears to satisfy SPHERE guidelines and the number of water points appears satisfactory for (12x500 + 6x400 + 24x250 =) 14,400 people.

ACT/Caritas's medium-term plan is to replace the bladders with additional hand-pumps. Moreover, ACT/Caritas has been asked by Arab leaders along the Garsila-Um Kher road to supply drilled boreholes and hand-pumps against guarantees of secure passage to Um Kher. Whether ACT/Caritas should go down the road of exchanging services for security is something that should be considered deeply – aside from ethical consideration, it has the potential to escalate.

9.3.5 Village Water Supply

ACT/Caritas Garsila has also provided water supply in over 20 villages. Most do not have resident IDP communities, but are either nomadic (Arabic) damras or farming villages where part of the population have left as IDPs (and may return) and part have chosen to risk staying to farm their land. The motivations for ACT/Caritas's programme have been:

- peace-building and equitable treatment (i.e. damras as well as fur farming villages)
- political concerns (security – see above 9.3.4)
- support for farmers who have chosen to remain in villages and preparation for IDP return.

Two such villages were visited by the author: the damra of Dagul Fatr, near Garsila, and the village of Mindo around 15 km north of Garsila. It seems that the efficiency of ACT/Caritas's drilling rig has far outstripped ACT/Caritas's ability to organise effective management committees.

The single borehole and hand-pump at Dagul Fatr was still working but was apparently rather inefficient, probably due to leakages in the rising main or valves. The committee at Dagul Fatr had not reported any problem to ACT/Caritas. One of the two ACT/Caritas boreholes at Mindo suffered the same problem, as well as a significant drainage problem around the headworks. The water committee there had no clear plans to rectify the situation and were looking to ACT/Caritas to do the work.

In fact, ACT/Caritas's program for WatSan committee development appears very cursory and merely consists of basic training on how to keep the well head clean and protected etc. No training is given in maintenance of hand-pumps and no tools are made available. Furthermore, no financial contribution is expected from the villagers (although pastoralist communities are capital-rich and should be able to pay) nor has any system for revenue collection been set up to pay for parts or repairs.

9.3.6 Technical / Organisational Capacity

ACT/Caritas's Garsila office has excellent technical capability in the field of WatSan and hygiene promotion. As in Zalingei, this is likely partly due to fact that the office has a field coordinator with a background in WatSan Engineering. The office as whole maintains 38 staff, of whom 15 are office and program staff. The Environmental Engineering (water and sanitation) team comprises 3 men – one WatSan manager and two technicians (one each based in Daba and Deleig camps). The Community mobilisation (hygiene promotion) team comprises 3 men and 2 women: their main activity is in Daba camp – activities in Deleig appear somewhat sporadic and constrained by travel and security concerns. The hygiene promotion team is in the habit of obtaining disease incidence rates from clinics and of carrying out surveys of diarrhoeal incidence in households.

The delayed progress in meeting SPHERE standards at Deleig and Daba is undoubtedly partly related to uncertainties regarding the future of the Garsila office (and, earlier, a policy of "winding down" activities) and difficulties in acquiring materials. Currently, capacity is limited by the head of the WatSan team "covering" the post of office manager, while a new office manager is recruited.

As at Zalingei, the WatSan team have been highly efficient at constructing and rehabilitating hand-pump facilities, but it seems that the performance of the drilling rig far outstrips the current ability of the office to mobilise responsible and effective water committees for rural hand-pumps. Currently, training of committees appears fairly minimal: tools and maintenance training are not clearly provided. No financial contribution is required from beneficiaries and committees are not encouraged to set a tariff to support maintenance and purchase of spare parts.

The office appears to have adequate vehicles (4) and communications equipment, although the water engineering staff could benefit from additional computing facilities.

9.3.7 Phase-out / Handover

See Chapter 11.

9.3.8 Capacity Building

The ACT/Caritas WatSan staff should attend workshops on (i) Environment and Monitoring of Water Resources; (ii) Water quality monitoring. This should include training in use of the DelAgua test kit and agreement on policy for microbiological testing of water. Staff should be provided with water level "dippers" to routinely monitor rest (prior to morning switch-on) and pumping (prior to evening switch-off) groundwater levels in pumped dug wells in Deleig.

Water level loggers ("divers") should be installed in key water supply boreholes at Deleig and Daba camps. Staff should receive training in installing, downloading and maintaining such loggers. This is recommended to ensure that borehole capacity is fully quantified and that boreholes are being managed sustainably to ensure security of supply.

Further aspects of capacity building are dealt with in Chapter 11.

9.3.9 Recommended Actions

- Plans for improvement of water supply in Deleig should be implemented as soon as possible to ensure that SPHERE guidelines are achieved. Timeline: Feb. 2008.
- Plans for improvement of water supply in Daba camp should be quantitatively reviewed to ascertain whether the improvements will result in SPHERE compliance in all three sub-camps. If SPHERE compliance will not be achieved with the 2007 works, further water supply improvements should be planned and budgeted for 2008. Timeline: Nov. 2007
- At 3-monthly intervals, a team comprising WES, ACT/Caritas, TEAR Fund, IMC and InterSOS should visit the main IDP camps to carry out quality control of WatSan provision and assess compliance with SPHERE standards. Timeline: Immediately
- At Deleig camp, raw water from all dug wells (especially pumped wells) should be submitted for chemical analysis to ensure that it meets Sudanese water quality regulations. Timeline: Dec. 2007.
- At all three IDP camps, water from all hand-pumps and dug wells should be analysed for microbial quality. Timeline: Dec. 2007.
- Pumped dug wells in Deleig camp should be covered to prevent contamination. Timeline: Feb. 2008.
- Drainage around all open dug wells should be reviewed and, if necessary, works should be carried out to reinstate concrete aprons around wells. Consideration should be given to partially covering such wells to minimise entry of debris. Timeline: Feb. 2008.
- The continued provision of latrine materials to households in the IDP camps should be planned with the other active INGOs, with a view to increasing the incidence of household latrines to 60% by the end of 2008. Timeline: Dec. 2008.

- Design of latrines in IDP camps should be reviewed with the objective of making them more resistant to collapse during the rainy season. Moreover, it would seem that, for household latrines, the responsibility for repair or rehabilitation should dominantly be with the household not the NGO. ACT/Caritas and TEAR Fund should explore with WatSan committees the hurdle to households assuming a greater degree of responsibility in this respect. Timeline: Dec. 2007.
- ACT/Caritas should ensure a regular supply of soap for distribution in Daba and Deleig camps. Soap distributions should be coordinated with hygiene promoters' activities in Daba and Deleig camps. It is hoped that this would prove a catalyst for discussions regarding hygiene behaviour. Timeline: Dec. 2007.
- The WatSan programme for 2008 should focus closely on effective development of water committees to maintain hand-pumps. Outside of IDP camps, communities should be encouraged to set a tariff to cover parts and maintenance. In the case of new hand-pump projects, consideration should be given to whether communities should be required to make a financial contribution to the project. WES policy (Nyala) suggests a contribution of 3%, which would be \$150 or 300 SuP for a typical hand-pump project costing \$5000 USD.
- ACT/Caritas should work closely with WES and other INGOs (especially TEAR Fund) to develop a spare-parts centre for hand-pumps, possibly covered by a revolving fund. NGOs or water committees accessing the centre would pay for parts. Consideration should also be given to training and equipping two regional hand-pump mechanics who, against a fee, can repair damaged pumps. Timeline: Spare parts centre initiated mid-2008.

10 CROSS-CUTTING ISSUES

10.1 GENDER

All aspects of ACT/Caritas's and SUDO's work in the fields of Water, Sanitation and Hygiene Promotion appear to be male dominated. All except one of ACT/Caritas's water and sanitation engineering staff are men. Hygiene promotion staff are more balanced, although the spokesman/leader of the hygiene groups typically is male.

As regards Water Committees and Hygiene Committees in camps and villages, these are also typically male-dominated and the spokesperson is always male. This seems to have a connection with the fact that such committees are typically selected by the sheikh(s) of the village or camp. The explanation typically given is that women are too busy in the house to take part in committees or that they are unwilling to travel around within a camp.

It is, however, interesting that one instance where women form a small majority in the water committee is in the Jabaleen part of Daba Camp (Garsila). I am sure it is not coincidental that ACT/Caritas's community mobiliser in this sub-camp is a highly motivated and articulate woman (Darnaim Adam). She sees no fundamental reason why women cannot be equally represented in such committees.

In summary, gender is simply not an issue which currently forms a central part of ACT/Caritas's or SUDO's WatSan program, either in Nyala or in the field stations. This may partly be due to a culture where male sheikhs influence the selection of water and hygiene committees but is undoubtedly also due to the fact that women are grossly under-represented in ACT/Caritas's staffing. To make some headway in rectifying this situation:

- ACT/Caritas and SUDO must make a conscious effort to employ a significantly greater proportion of women in their WatSan programs, both within their international and senior national staff and within their teams of community mobilisers.
- Ms Darnaim Adam should be invited to contribute to a workshop for other WatSan and Hygiene Staff in order to communicate her strategy and experiences of mobilising women in Daba camp. Timeline: March 2008.

10.2 ENVIRONMENT AND LIVELIHOOD

Earlier in 2007, a team coordinated by TEAR Fund (Bromwich et al. 2007) carried out a thorough study of the impact of the Darfur crisis on the environment. One aspect of this was the over-abstraction of groundwater from the wells and aquifers of Darfur. Although there is not likely to be any danger of regional overabstraction from the Basement Aquifer of Darfur, there may be an issue of local overabstraction around borehole clusters at IDP camps. Aside from the environmental issues, this has significance for security of water supply within IDP camps – it is thus fairly and squarely an emergency issue and not just a longer-term developmental issue.

The TEAR Fund study particularly bemoaned the lack of hydrogeological understanding of INGOs of the water wells that they operate and also the lack of monitoring of those sources. IDP camps are essentially small towns and no self-respecting town water supply utility would operate a well (Misstear et al. 2007) without (a) fully understanding its geology and hydrogeology, (b) monitoring quantities of water abstracted, (c) monitoring water quality and (d) monitoring water levels (at rest and during pumping).

The TEAR Fund study by Bromwich et al. (2007) also called for "information centres" to be set up on a regional basis to which INGOs would submit environmental, hydrogeological and monitoring data. The current ACT/Caritas operation is unique in my experience with Norwegian Church Aid in diligently collating and databasing (Excel and paper copies) drilling logs, drilling data and chemical analyses of groundwater. These data represent a large percentage of current hydrogeological knowledge about Darfur and will be invaluable in the future planning and management of water resources in the area. ACT/Caritas submit these data regularly to WES via UNICEF (although it is unclear if the original paper

drilling logs are submitted). However, the data (both digital and paper logs) should also be submitted (a) to the national geological service of Sudan in Khartoum and (b) to an internationally recognised archive of geological data for future safekeeping (such as the Geological Society of London's library). Such international archives have proved hugely valuable to hydrogeologists trying to develop water resources in nations that have been devastated by conflicts and where records have been lost.

Box 10.1: A Battle for Livelihoods

"Darfur is an example of a situation where a dire scarcity of natural resources is manipulated by politicians for their own ambition. To outsiders, the conflict is seen as tribal warfare. At its roots, though, it is a struggle over controlling an environment that can no longer support all the people who must live on it...You must not deal only with the symptoms. You have to get to the root causes by promoting environmental rehabilitation and empowering people to do things for themselves. What is done for the people without involving them cannot be sustained."

Wangari Maathai, Winner of the 2004 Nobel Peace Prize (Washington Post 12/5/05)

We see this battle for livelihoods and resources even within DERO's programme area. Pastoralist peoples typically seek pasture along the fertile banks of wadis and water from wells in the wadi beds at dry times of the year when forage is scarce elsewhere (Unruh 1995). This brings them into potential conflict with farmers who farm the same land. As population increases and more people adopt a farming lifestyle, access to the wadis becomes increasingly difficult for pastoralists.

Towns typically evolve adjacent to major wadis (Nyala, Zalingei) and it is these towns that attract IDPs, drawn to their security and resources. In Khamsa Degaig in Zalingei, IDPs have settled along the banks of the Wadi Arriba. Some have even begun farming plots of land along the wadi banks, several km from the camp. They complain that nomads come during harvest time and their animals trample and graze their crops.

The settlement (temporary, semi-permanent) of IDPs along major wadis runs the risk of further marginalising pastoralist communities by limiting access to traditional resources. This potentially brings further risk of conflict.

The two aspects of monitoring that ACT/Caritas is not currently performing in a systematic or diligent manner are:

- systematic monitoring of microbiological quality (this has been discussed in Chapter 8)
- systematic monitoring of groundwater levels in abstraction wells in order to ensure security of supply. This is especially important in camps such as Daba, where water sources are currently severely stretched and where we are uncertain of available resources.

It is recommended that by March 2008:

- Water level dipping tapes be acquired for pump operator staff at dug wells in Khamsa Degaig and Deleig camps. Training should be provided to operators in measuring water levels. Water levels should be monitored at least twice every day in the pumped dug wells: before pump switch-on each morning (rest water level) and before the cessation of pumping each evening.
- Simple groundwater level monitoring loggers ("divers") should be installed in the "Central" borehole of Deleig and in the three boreholes at Daba. ACT/Caritas (and eventually SUDO) staff should be trained in downloading such logger data at regular intervals, interpreting and archiving this data. Every 6 months the combined data shall be reviewed by a professional hydrogeologist.
- ACT/Caritas should continue to archive drilling logs, water analyses (and any water level monitoring data) in an efficient database and submit it to UNICEF/WES and UNEP. Additionally, drilling logs and analyses should be systematically copied. Hard-copy and digital data should be sent to the Geological Survey of Sudan and to an international archive such as the library of the Geological Society of London (this can be arranged by the author).

11 CONCLUSIONS AND RECOMMENDATIONS

11.1 HANDOVER AND CAPACITY BUILDING

11.1.1 Handover to a Local Partner

ACT/Caritas have, over the course of three years in Darfur, created a WatSan team with an excellent level of professionalism, diligence and competence. Current signs are that the Darfur crisis is not reaching a speedy resolution and may even deteriorate rapidly. In view of this, I would question the wisdom of DERO's strategic plan to transfer operational activities to local partners, at least in the field of Water and Sanitation.

However, given that the Strategic Plan has been agreed, I must draw the following conclusions regarding the feasibility of handing over WatSan operational activities to a local partner.

1. I do not believe that such a handover can realistically be achieved by mid-2008. At least another full programme year must elapse before a candidate organisation will be in a position to take over a significant component of ACT/Caritas's WatSan activities. I do not believe that transfer can be completed before 2009.
2. Sudanaid and SCC have not been considered as potential inheritors of ACT/Caritas's WatSan activities on the grounds that they have no current WatSan implementing experience. Furthermore, there appears to be a consensus that they be allowed to focus on the sectors and locations that represent their strengths, rather than to diversify into a new, unknown sector.
3. WES may be willing to inherit responsibility for maintaining certain installations (e.g. hand-pumps constructed by ACT/Caritas). However, their status as a government organisation means that they are not present in all areas of Darfur. Their capacity is uncertain, but my observations lead me to believe that they do not have the staff or vehicle resources to implement a programme mass comparable to ACT/Caritas's current activity.
4. SUDO is the sole local partner candidate that, under other circumstances, may have been an ideal inheritor of ACT/Caritas's WatSan activities. However:
 - SUDO has its origins as an advocacy organisation that has been critical of the Sudanese Government and has, on past occasions, been suspended from operating. Can it now reliably deliver humanitarian relief in a neutral manner without interference from GoS?
 - Through a combination of poor budgeting and programme management (and, arguably, negligence on the part of its DERO partner, ACT/Caritas) SUDO has evolved to a situation where it is very weak in infrastructural resources (vehicles, computers, communication) and is not paying salaries sufficient to attract and retain adequately qualified national WatSan staff.
 - SUDO has no presence in Kubum or Garsila, and no operational WatSan capacity in Zalingei. These locations are the current focus of ACT/Caritas's WatSan activities.

These factors indicate that SUDO is not currently in a position to assume responsibility for implementing ACT/Caritas's WatSan programme by mid-2008.
5. SUDO could conceivably be in a position to assume a significant part of ACT/Caritas's WatSan program by early to mid-2009.

11.1.1 It is thus recommended that the DERO partnership work towards the handover of ACT/Caritas's current operational activities in Water, Sanitation and Hygiene Promotion to SUDO, provided the following criteria (11.1.2 to 11.1.10) are fulfilled. Timeline: Hand-over to SUDO early-mid 2009

11.1.2 SUDO's and ACT/Caritas's WatSan program for 2008 (and 2009) must be jointly developed, agreed and budgeted as a combined DERO program.

- 11.1.3 SUDO must demonstrate their commitment to achieving an internationally acceptable level of WatSan service provision in their operations in Mershing and Bilel camps. Timeline: Water supply in Mershing and Bilel camps achieves SPHERE compliance by end of 2008.
- 11.1.4 The reasons for SUDO's low salaries to qualified staff should be investigated to ensure that salaries actually paid match salaries budgeted. SUDO must commit to paying a salary level that is adequate to attract qualified and experienced national water engineers, hydrogeologists and technicians. Timeline: Assessment complete by end 2007.
- 11.1.5 ACT/Caritas and SUDO should operate joint WatSan offices and programs in ACT/Caritas's current operational areas of Garsila, Kubum and Zalingei throughout 2008. During 2008 SUDO staff work alongside ACT/Caritas staff in Garsila, Zalingei and Kubum to build their own capacity and to gain intimate organisational experience of the programmes and reporting regimes (see Box 7.2).
- 11.1.6 SUDO should be willing to employ two-three new experienced WatSan staff to head SUDO's WatSan operations in Garsila, Zalingei and Kubum. Timeline: Senior national WatSan staff in post by March 2008.
- 11.1.7 Following a program of co-working in 2008, SUDO should be provided with the opportunity to employ ACT/Caritas's existing national WatSan and hygiene promotion staff in Garsila, Zalingei and Kubum. Timeline: Option for transfer of ACT/Caritas national WatSan/HP staff to SUDO at end of 2008.
- 11.1.8 DERO must commit to developing a budget for 2008 and 2009 that will allow SUDO to build up an infrastructure (office space, communications, computers, vehicles) appropriate to the scale of WatSan operation for which SUDO is envisaged to take responsibility. ACT/Caritas must be prepared to transfer such resources that gradually become surplus to requirement during its transition to a "support and capacity building organisation". The ACT/Caritas drilling rigs are excluded from this consideration (see below).
- 11.1.9 ACT/Caritas should locate their WatSan program officer within SUDO's office in Nyala during 2008 to assist SUDO's own Water Engineer and build capacity within SUDO as regards programming and budgeting. Furthermore, it is recommended that ACT/Caritas place an accountant/finance officer within SUDO's Nyala office during 2008/09 to assist with and build capacity in budgeting and financial/narrative reporting. Timeline: ACT/Caritas staff partnering SUDO in SUDO's Nyala office by start 2008.
- 11.1.10 SUDO must consider whether its advocacy activities are compatible with the proposed humanitarian relief activities in the field of WatSan. Timeline: Policy decision and assessment of implications by end of 2007.
6. The main areas where DERO should assist SUDO with capacity building are:
- Development of coherent programming skills
 - Reporting
 - Training in international standards of relief provision (SPHERE)

The most effective method of capacity building is, as mentioned, to arrange for SUDO staff to work closely alongside ACT/Caritas staff in the same physical location and on the same programs.

11.1.2 The ACT/Caritas Drilling Rigs

The ACT/Caritas drilling teams appear to have developed into such coherent and efficient units that I cannot recommend a straight handover of these to another partner until that partner has demonstrated

a proven track record in (a) personnel management and retention and (b) WatSan operationality. I do not believe that SUDO has clearly demonstrated either of these attributes as yet. Furthermore, given the recommendation that drilling activities should be "restrained", in favour of development of sustainable management of hand-pumps, it is possibly not appropriate that the rigs be lodged with a single DERO member who may not have funding to keep the rigs in full-time operation.

- 11.1.11 If ACT/Caritas does not wish to retain and implement a drilling capacity, it is recommended that the drilling rigs be reorganised to form a financially and managerially autonomous unit – for example "DERO Drilling". For such a drilling unit to be viable, it would also need to acquire geophysics equipment, a competent manager (drawn from ACT/Caritas's WatSan staff) and a field geologist/geophysicist. Timeline: Creation of DERO Drilling as autonomous entity no later than the start of 2009.

This could simply be as an autonomous NGO within the DERO partnership, whose charter obliges them to provide services primarily to the DERO partners, but does not preclude them from offering services to WES or other NGOs on a not-for-profit basis.

Alternatively, "DERO Drilling" could conceivably be structured as a limited company in which DERO partners hold shares. Clearly, the possibilities for this arrangement will depend (a) on what arrangements are permitted by Sudanese Law and (b) on whether the donors that originally funded the rigs would approve of such an arrangement. Over the years, one could offer the employees of the unit the opportunity to acquire shares (en lieu of a proportion of salary), thus slowly transforming the unit into a viable commercial drilling concern (and I would argue that Darfur desperately needs viable businesses).

In order for such a concept to become viable, significant hurdles need to be crossed and the following actions should be taken:

- 11.1.12 Ascertain whether ACT/Caritas's drilling team and key water engineering / geological staff would be interested in autonomy as "DERO Drilling".
- 11.1.13 Assess the financial viability of "DERO Drilling" and develop a business plan.
- 11.1.14 Ascertain the legal obstacles and opportunities to the formation of "DERO Drilling" as an autonomous DERO NGO partner or (preferably) as a limited company. Who would be the stakeholders/shareholders?
- 11.1.15 Ascertain the willingness of the original rig donors to accept a "DERO Drilling" concept.
- 11.1.16 If the "DERO Drilling" concept is found not to be viable, handover of the drilling rigs and crews to WES (one to West Darfur, one to South Darfur) should be considered. Any hand-over protocol should ensure the availability of the rigs to DERO partners at a reasonable cost.

11.1.3 Transfer of Hand-Pump Maintenance Responsibility to WES

By its focus on the drilling and rehabilitation of hand-pump facilities and its neglect to establish functioning and responsible water committees amongst users, ACT/Caritas have acquired a de facto responsibility for maintaining in excess of 200 rural hand-pumps in villages, damras and host towns. WES and UNICEF envisage WES as having a role in accepting a joint responsibility (with the user communities) for maintaining such facilities following the departure of INGOs. However, there is a clear lack of capacity (especially in terms of mobility) in the smaller WES offices and, I suspect, a lack of real motivation. Furthermore, most NGOs (including ACT/Caritas) have flown in the face of WES policy by installing hand pumps free of charge in towns and villages and have neglected to train water committees in hand-pump maintenance and tariff setting.

- 11.1.17 It is recommended that ACT/Caritas aim to transfer responsibility for hand-pump maintenance to WES and user communities in the medium term. This must not, however, be a rapid "hand-washing" exercise but must be carried out gradually, with the

development of spare-parts and mechanics networks and with material support for WES. Timeline: Handover of maintenance responsibility for hand-pumps to WES and user communities by end of 2009.

- 11.1.18 ACT/Caritas and SUDO should, in 2008/09, be willing to focus on developing responsible water user committees (especially in communities outside IDP camps): community management structures and capacity building; training in hand-pump maintenance; revenue collection to pay for parts and maintenance.
- 11.1.19 ACT/Caritas, together with WES and other NGOs, should formulate a programme to set up revolving spare parts funds and centres in Kubum, Garsila and Zalingei. A limited number of local mechanics should be trained and associated with the centres, whose services would be paid for by the community members. Timeline: Spare parts centres initiated by mid-2008.
- 11.1.20 ACT/Caritas should expand the capacity of WES by contributing mobility (probably in the form of motor cycles for WES staff) and possibly also communication facilities. Training should be provided to WES staff in well maintenance, hygiene promotion, record-keeping, tariff-setting and reporting. Timeline: Material and training support to WES provided in 2008 DERO budget.
- 11.1.21 The Ministry of Irrigation and Water Resources, possibly in tandem with UNICEF, should be willing to support the salaries of an adequate number of educated staff at WES in Zalingei, Garsila and Kubum to manage a hand-pump maintenance activity. Timeline: Negotiations with WES and UNICEF to commence immediately.
- 11.1.22 WES should be enticed back to re-open their Kubum office. This may involve DERO joint-funding the salaries of staff and office space for a limited and pre-specified period of time. UNICEF in Nyala should be approached to obtain support and possible joint funding for this activity. Timeline: WES to reopen activity in Kubum by mid-2008.

11.1.4 Kubum Field Office

The Kubum field office has not been visited as part of this assessment. Its WatSan activity is funded by Austrian Caritas and is reported to comprise the following:

- Water supply and sanitation at 3 small IDP camps near Kubum town, totalling c. 6000 IDPs. Water is delivered by two bladder systems combined with hand-pumps on drilled boreholes.
- A programme of drilling boreholes with hand-pumps in villages (some hosting IDPs) around Kubum. It has been estimated that ACT/Caritas have drilled or rehabilitated a cumulative total of around 100 boreholes in the area.

There is a desire on the part of DERO management to wind down activities at Kubum, culminating in closure of Kubum as field office. This is understandable in the light of the relatively small numbers of IDPs that are being served in this area. However, it is also a little embarrassing that ACT/Caritas apparently took over WES's water supply activities in Kubum, leading to WES withdrawing from the area. ACT/Caritas are also currently regarded as lead agency in WatSan in Kubum area by UNICEF.

Not having visited the area, I cannot make any specific recommendations regarding the status of Kubum. I would, however, note the following:

- Although IDP numbers are small, ACT/Caritas has an ongoing responsibility towards them and there seems to be no other NGO present in the field of water supply that can serve them.
- Unless the investment that DERO has made in boreholes (possibly as much as \$500,000) can be regarded as a purely emergency measure with a lifetime of a few years, ACT/Caritas have a responsibility to establish a maintenance and support structure, based on the training of user communities and setting of user tariffs to cover maintenance and parts, to give the hand-pump network a chance of a sustained useable life.

It thus seems unavoidable that ACT/Caritas or SUDO will, at the very least, have to maintain a small local staff of WatSan technicians in Kubum to support the water supply in the IDP camps and to work with water user committees to establish a spare parts and maintenance framework for hand-pumps. Recommendation 11.1.22 (above) suggests that DERO negotiate the return of WES to Kubum to assist with these support activities and eventually to assume responsibility for them.

11.2 ORGANISATIONAL CONCLUSIONS

From a technical perspective, the WatSan programs run out of the Zalingei and Garsila field offices are implemented to a very high level. Staff are competent and motivated. The service provided at Khamsa Degaig IDP camp is especially praise-worthy. It is well-managed and reviewed regularly by other NGOs and WES. I believe it meets the majority of SPHERE standards without excessively exceeding them (Figure 8). The residents of the camp seem satisfied with the service provided.

In Garsila, too, the services provided to the Daba and Deleig camps are on the road to compliance with SPHERE guidelines. Both security difficulties (Deleig) and uncertainty as regards the continued operation of the Garsila office have contributed to some of the lapses observed at these camps. The ACT/Caritas team in Garsila has a clear vision of how they will achieve improved water supply in the camps within the 2007 budget. I believe that the plan for Deleig camp will achieve SPHERE compliance if diligently executed. I am less certain about the plan for Daba camp: while I would encourage the Garsila staff to continue with the existing water supply improvement plan for Daba, I would suggest that they review the plan to ascertain whether it is adequate to ensure full SPHERE compliance. Further improvements may be necessary in all three areas of Daba and these should form a component of the 2008 budget.

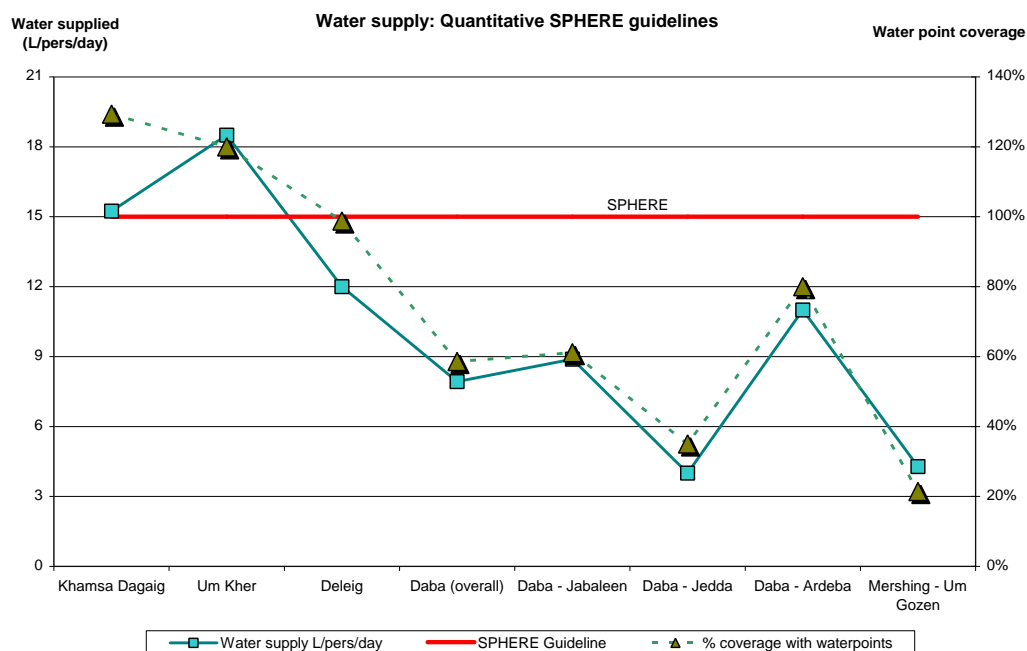


Figure 8. Performance of water supply in ACT/Caritas and SUDO camps against SPHERE quantitative guidelines. Note that we assume that 1 hand-pump can supply 10,000 L/day (optimistic). In Khamsa Degaig, only the bladder systems are considered when calculating per capita water supply (L/day)

I am concerned that, in the one camp observed where SUDO is responsible for water supply, provision of clean water falls well below acceptable levels (Mershing). In one sub-camp at Mershing there was no available water supply at the time of the field visit (Ton Qitr). SUDO must accept that, if it wishes to develop a WatSan activity within the DERO framework (and especially if it wishes to take over a component of ACT/Caritas's program), it must commit to compliance with international standards such as SPHERE.

Water sources are generally located in a manner that minimises pollution risk. A very few examples of hand-pumps were observed that were located too close to latrines or had poor surface drainage (e.g. Hammidiya Sector 7). I am concerned that large diameter dug wells in Deleig (in particular) are open and sometimes poorly drained around the well head. There is a high potential risk for contamination of these wells (which contravenes SPHERE guidelines).

In terms of latrine provision, at least 40% of all households have their own latrines in the major camps. I would encourage the Garsila field office, in particular, to work together with the other main NGOs to continue to assist with provision of latrine slabs to households. Design of latrines should be reviewed with a view to making them more resistant to collapse in the rainy season.

Water and hygiene committees in camps are usually selected by sheikhs. Usually, men outnumber women on these committees and they cannot be considered wholly representative. A few exceptions (Jabaleen in Daba camp) prove, however, that women can be encouraged effectively to participate. Hygiene promotion activities are somewhat unevenly distributed in the camps and are typically focussed on the camps nearest the ACT/Caritas field offices.

ACT/Caritas's field offices have become increasingly active in terms of provision of water supply in villages, host towns (Zalingei and Garsila) and damras. The capacity of the ACT/Caritas drilling rig far outstrips the organisation's ability to mobilise and train water committees to accept responsibility for hand-pumps. I believe that ACT/Caritas has largely failed to efficiently mobilise responsible well management committees: they are seldom trained in pump maintenance, typically have no tools, are not motivated to keep the hand-pump well-drained, tidy and functional and have not been encouraged to set any form of tariff to pay for parts or maintenance. I believe that in 2008, ACT/Caritas should strongly resist the urge to drill large numbers of new boreholes outside the camp areas. ACT/Caritas should rather focus on consolidating the sustainability of the facilities it has already installed. It should work closely with WES and other NGOs to develop responsible management committees with functioning tariff structures.

11.3 RECOMMENDATIONS

This section specifically excludes recommendations related to the proposed hand-over of ACT/Caritas's WatSan activities to a local partner. These are enumerated in Section 11.1.

11.3.1 General Recommendations

- 11.3.1 DERO's WatSan activities in 2008 should focus on achieving and maintaining SPHERE standards for water supply, sanitation, hygiene promotion, vector control and solid waste disposal in IDP Camps and Settlements.
- 11.3.2 ACT/Caritas and SUDO should reduce the quantities of new boreholes and hand-pumps drilled outside IDP settlements in 2008. In the WatSan programme for 2008, activities in villages, host towns and damras should be focussed on establishing (i) functioning water management committees or trustees, (ii) training committees and/or local mechanics in hand-pump maintenance, (iii) establishment of spare parts networks and (iv) establishing revenue collection systems amongst users to pay for parts and maintenance (v) participatory monitoring and evaluation..
- 11.3.3 In the case of new hand-pump projects, consideration should be given to whether communities should be required to make an "up front" financial contribution to the project. WES policy (Nyala) suggests a contribution of 3%, which would be \$150 or 300 SuP for a typical hand-pump project costing \$5000 USD.
- 11.3.4 The above priorities could change if the security situation permits a rapid return of IDPs to home villages. DERO members should develop a contingency plan for its WatSan response in this event.
- 11.3.5 ACT/Caritas and SUDO must make a conscious effort to employ a significantly greater proportion of women in their WatSan programs, both within their international and senior national staff and within their teams of community mobilisers.

- 11.3.6 Ms Darnaim Adam should be invited to contribute to a workshop for other WatSan and Hygiene Staff in order to communicate her strategy and experiences of mobilising women in Daba camp. Timeline: March 2008.
- 11.3.7 ACT/Caritas and SUDO should develop a framework for systematic microbiological testing of all groundwater sources using the DelAgua kits. It should also regularly monitor microbiological quality of wells and hand-pumps within IDP camps to demonstrate SPHERE compliance (which requires the absence of faecal coliforms). A system should be established for procurement and supply of consumables to field stations. Timeline: Dec. 2007.
- 11.3.8 NGOs seem to expend a lot of effort rehabilitating household latrines that have collapsed during rains. Design of latrines should be reviewed with the objective of making them more resistant to collapse during the rainy season. Moreover, it would seem that, for household latrines, the responsibility for repair or rehabilitation should dominantly be with the household not the NGO. ACT/Caritas, SUDO and other NGOs should explore with WatSan committees the hurdle to households assuming a greater degree of responsibility in this respect. Timeline: Dec. 2007
- 11.3.9 WatSan and Hygiene Promotion teams should liaise more closely with UNICEF and NFI programs to coordinate distribution of soap (SPHERE guidelines require 250g per pers per month) with hygiene promotion campaigns. Informal discussions suggest that soap can be used a "door-opener" in the context of hygiene promotion house visits. Timeline: Dec. 2007.
- 11.3.10 ACT/Caritas should acquire groundwater level "dippers" for drilling staff (if not already provided) and train them in appropriate test pumping procedures, such as those recommended by MacDonald et al. (2005) and Misstear et al. (2007). Timeline: Mar. 2008.
- 11.3.11 Water level dipping tapes should be acquired for pump operator staff at dug wells in Khamsa Degaig and Deleig camps. Training should be provided to operators in measuring water levels. Water levels should be monitored at least twice every day in the pumped dug wells (i) before pump switch-on each morning (rest water level) and (ii) before the cessation of pumping each evening. Timeline: March 2008.
- 11.3.12 Simple groundwater level monitoring loggers ("divers") should be installed in the "Central" borehole of Deleig and in the three boreholes at Daba. ACT/Caritas (and eventually SUDO) staff should be trained in downloading such logger data at regular intervals, interpreting and archiving this data. Every 6 months the combined data shall be reviewed by a professional hydrogeologist. Timeline: March 2008.
- 11.3.13 ACT/Caritas should continue to archive drilling logs, water analyses (and any water level monitoring data) in an efficient database and submit it to UNICEF/WES and UNEP. Additionally, drilling logs and analyses should be systematically copied. Hard-copy and digital data should be sent to the Geological Survey of Sudan and to an international archive such as the library of the Geological Society of London (this can be arranged by the author). Timeline: March 2008.
- 11.3.14 Technical staff at both ACT/Caritas and SUDO will benefit from training workshops in the following areas: (i) The TEAR Fund "Darfur: Relief in a Vulnerable Environment" report, which is likely to form the basis of a UNEP program in 2008. This should incorporate a session on "Livelihood, resources and power" outlining how provision of water can be used as an element in a power struggle; (ii) Improved methods of test pumping and groundwater source monitoring; (iii) Water quality – our responsibilities; (iv) Community contribution to, and management of, water sources, with an emphasis on tariff-setting by user committees (participatory approaches in community-based projects in emergency scenarios); (v) in-depth training on PHAST. Timeline: During 2008.

11.3.2 SUDO South Darfur

- 11.3.15 Joint ACT/Caritas / SUDO / IRC and WES assessment of Bilel Camp to ensure compliance with SPHERE guidelines and to draft plans for medium-term handover of responsibility (if any). Timeline: Dec 2007
- 11.3.16 Handover of single borehole in Hashaba camp (Mershing) to World Vision for ongoing maintenance and management. Timeline: Dec 2007
- 11.3.17 Installation of additional water supply points in Um Gozen (Mershing) to ensure SPHERE compliance in terms of quantities supplied and number of delivery points. Timeline: Feb 2008.
- 11.3.18 Joint ACT/Caritas and SUDO assessment and mapping of WatSan needs in Ton Qitr camp (Mershing) and installation of additional water supply points in Ton Qitr to ensure SPHERE compliance in terms of quantities supplied and number of delivery points. Mobilisation, training and provision of tools to a separate water and hygiene committee in Ton Qitr. Timeline: Feb 2008.
- 11.3.19 KAP survey and clear development of a program for implementation and monitoring of hygiene promotion activities within Um Gozen, and control against clinical data. Timeline: Dec 2008.
- 11.3.20 Review of reasons for lack of representation of women within SUDO's camp staff and within water / hygiene committees. Timeline: Dec 2008.

11.3.3 ACT/Caritas Zalingei

- 11.3.21 At Khamsa Degaig and Al Hammidiya camps, raw water from all dug wells should be submitted for chemical analysis to ensure that it meets Sudanese water quality regulations. Timeline: Dec. 2007
- 11.3.22 At all three IDP camps, water from all hand-pumps should be analysed for microbial quality. In the light of these results, ACT/Caritas may wish to reconsider whether chlorination outside of the rainy season is strictly necessary. Timeline: Dec. 2007
- 11.3.23 When ACT/Caritas is drilling boreholes and fitting hand-pumps in camps for which it has not WatSan management responsibility, an agreement should be signed handing over the hand-pump to the managing NGO. In practice, I recommend that the two hand-pumps in Taiba be handed over to Mercy Corps and the five in Al Hammidiya be handed over to IRC. If necessary, ACT/Caritas should provide training to IRC/MC staff in hand-pump maintenance. Timeline: Jan 2008.
- 11.3.24 ACT/Caritas should enter into dialogue with IRC and the WatSan/hygiene committees to provide adequate drainage from new hand-pumps in Sector 7 of Al Hammidiya, to ensure that nearby latrines are adequately relocated and that a consistent policy of chlorination is adopted. Timeline: Dec. 2007.
- 11.3.25 ACT/Caritas should ensure that WatSan committees in Khamsa Degaig and Al Hammidiya receive full training for hand-pump maintenance and that tools are lodged with an ACT/Caritas pump operator on site. Timeline: mid-2008
- 11.3.26 The brick-clay excavations on the edge of the major IDP camps are accumulating both water and waste and will provide breeding ground for mosquitoes. When the clay pits are exhausted, they should ideally be backfilled with inert waste or, at the very least, sprayed on a systematic basis to control insects. Timeline: mid-2008.
- 11.3.27 There may be a need for a refresher course for ACT/Caritas hygiene staff in Zalingei on the fundamental principles of PHAST. Furthermore, hygiene teams should be encouraged to develop closer links with IDP camp clinics to monitor the impact of hygiene promotion in disease incidence levels. Timeline: mid-2008.

- 11.3.28 ACT/Caritas should complete the installation of hand-washing facilities at the school latrines as a matter of priority. To review the applicability of simple solar pumps as a technology for providing modest quantities of water for hygienic purposes within the schools. Timeline: Apr. 2008.

11.3.4 ACT/Caritas Garsila

- 11.3.29 Plans for improvement of water supply in Deleig should be implemented as soon as possible to ensure that SPHERE guidelines are achieved. Timeline: Feb. 2008.
- 11.3.30 Plans for improvement of water supply in Daba camp should be quantitatively reviewed to ascertain whether the improvements will result in SPHERE compliance in all three sub-camps. If SPHERE compliance will not be achieved with the 2007 works, further water supply improvements should be planned and budgeted for 2008. If additional boreholes are necessary, consider using WES rig to drill at larger diameter. Timeline for review of plans: Nov. 2007
- 11.3.31 At 3-monthly intervals, a team comprising WES, ACT/Caritas, TEAR Fund, IMC and InterSOS should visit the main IDP camps to carry out quality control of WatSan provision and assess compliance with SPHERE standards. Timeline: Immediately
- 11.3.32 At Deleig camp, raw water from all dug wells (especially pumped wells) should be submitted for chemical analysis to ensure that it meets Sudanese water quality regulations. Timeline: Dec. 2007.
- 11.3.33 At all three IDP camps, water from all hand-pumps and dug wells should be analysed for microbial quality. Timeline: Dec. 2007.
- 11.3.34 Pumped dug wells in Deleig camp should be covered to prevent contamination. Timeline: Feb. 2008.
- 11.3.35 Drainage around all open dug wells should be reviewed and, if necessary, works should be carried out to reinstate concrete aprons around wells. Consideration should be given to partially covering such wells to minimise entry of debris. Timeline: Feb. 2008.
- 11.3.36 The continued provision of latrine materials to households in the IDP camps should be planned with the other active INGOs, with a view to increasing the incidence of household latrines to 60% by the end of 2008. Timeline: Dec. 2008.

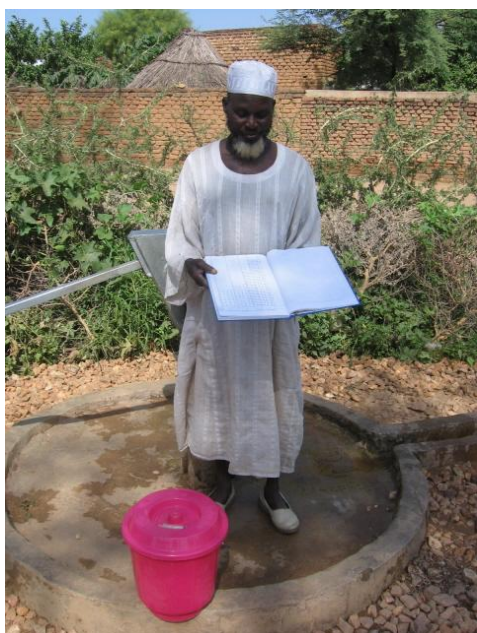


Figure 9. A hand-pump chlorinator with his record book. Khamsa Degaig camp, Zalingei

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13 APPENDIX A: TERMS OF REFERENCE FOR MISSION

The following ToR was provided prior to the study. It is intended as a joint ToR for both the Health/Nutrition and WatSan Sectors.

WatSan and Health& Nutrition Sector Reviews

Terms of Reference

1. Background of the sector review

The Darfur Emergency Response Operation (DERO) was established in June 2004 as a joint response to the humanitarian crisis resulting from the conflict in South and West Darfur. The coalition is supported by more than 60 humanitarian agencies belonging to the ACT and Caritas networks globally, with an operational presence in Darfur comprising NCA ACT/Caritas and 3 national non-governmental organisations, SUDO, SCC and Sudanaid.

Between June and September 2006, DERO conducted a Strategic Planning Process. The process was based on stakeholder involvement and was undertaken by a taskforce representing the Darfur, El Obeid and Khartoum levels of the implementing members (ACT/Caritas, SCC, SUDO and Sudanaid), and the Country Representatives of the two lead agencies (NCA and CAFOD).

The plan envisages restructuring DERO so that by mid-2008 SCC, SUDO and Sudanaid will have responsibility for their own direct implementation, either by implementing their own projects or in cooperation with local partners, community based organisations or relevant government ministries. Activities directly implemented by ACT/Caritas will be gradually phased out.

By a significant margin, Water and Sanitation (WatSan), Health and Nutrition are the largest sectors within DERO in terms of both expenditure and number of staff. NCA-ACT/Caritas and SUDO are the principal DERO partners in each of these sectors, although SCC and Sudanaid have well-defined but more limited roles in the Health sector, implementing activities in HIV and AIDS awareness and Health services respectively.

Consequently these three sectors are of strategic significance to DERO according to the Strategic Plan objectives which are centred around phasing-out and handover of NCA-ACT/Caritas's direct operational activities.

The 2007 Appeal, therefore, committed DERO to undertake sector reviews for WatSan and Health and Nutrition (the latter were merged in 2006 and are under a single management structure). Whilst the sector review will enhance our understanding of the technical capacities of the national partners in the WatSan and Health and Nutrition sectors, concurrent capacity assessments of the national partners will focus on organizational and management issues.

2. Purpose

To enable DERO members (through the National Coordination Group (NCG) and DERO Board) to make informed and appropriate decisions about the future of the WatSan, Health and Nutrition sectors in the evolving Darfur context.

3. Focus

For the WatSan, Health and Nutrition sectors, determine which activities should be retained/phased-out, handed over, how and to whom. The recommendations should be linked to the effects and follow up of the totality of the program included gender, GBV and the standards of participation and protection of women.

4. Objectives

Specific duties:

- 4.1. To review the performance, achievements, challenges and capacity (organisational and technical) of all DERO members in the three sectors (WatSan, health and nutrition) in relation to the below guidelines. A special focus should be on how the WatSan and health program have addressed issues related to FGM and GBV.
- 4.2. To review the progress and evaluate existing phase-out and handover processes
- 4.3. To ascertain which component of each sector should be phased-out or handed over and in the latter case, to whom and over what timeframe
- 4.4. To conduct a mapping exercise of other agencies / departments (e.g. Other NGOs, WFP, UNICEF, WES and MoH) that operate or plan to operate in DERO areas in order to ensure DERO operations are adding value as opposed to duplicating the humanitarian services of others (and to identify other non-traditional partners to hand over implementation to if required)
- 4.5. Where DERO members show potential to progress and improve, to identify what capacity development inputs would be required.
- 4.6. To enhance DERO members' understanding of their long term priorities/commitments, sectorally and geographically, and how this relates to their current capacities and performance. This should also be related to the current focus upon protection and participation and how DERO members relate to the humanitarian guidelines in this area.
- 4.7. To set progress indicators for proposed recommendations. It is a recommendation that the GEA tool could be used for that purpose.

5. Intended users of the sector review

- All DERO members (findings of the sector review will feed into the National Coordination Group and DERO board's discussions and reflections about the future of the WatSan, Health and Nutrition sectors and about the review of the strategic plan due to take place in September 2007.
- Particularly the NCA ACT/CARITAS Organisational Development and Capacity Building (ODCB) Unit, WatSan, Health and Nutrition Sector Heads of all four DERO members.
- Donors to the program

6. Sector reviews methodology and use of guidelines

Guidelines

The advisor will take into account framework described in the SPHERE handbook, the UNSCR 1325 and the related guidelines from the Norwegian government and use the IASC gender handbook in Humanitarian action, especially the chapters related to water and sanitation in the evaluation. He will further take into account the IASC guidelines for Gender Based Violence interventions in Humanitarian settings. For the assessment of the hygiene promotion interventions, the WHO and UNICEF standards should be used and consideration should be given to how the program has responded to the special needs of women suffering from rape and gender based violence effects and how this has been implemented in the program.

All recommendations shall be done by using the GEA as a tool for describing results according to effect upon men and women.

Approach

The evaluator will propose the methodology for the evaluation, however it should:

- Use international guidelines Sphere, the Red Cross Code of Conduct, UNSCR 1325, CEDAW and HAPI
- Ensure good representation, particularly in relation to gender. The interviews of women and men should be done proportional with the ratio.
- All data should be gender disaggregated

- Use participatory approaches and enable feedback from participants
- Special focus will be made to enable women to communicate about their experiences and views.

The consultant(s) will initially meet with key stakeholders including relevant sector staff from all DERO member organisations and a representative from the OD/CB Unit. This meeting will enable the consultant to review the work plan, focus and proposed participants / stakeholders identified for inclusion in the consultancy.

During the period of consultation, the consultants will be accompanied by a steering group of 3-4 members, with representation from DERO members and the OD/CB Unit. The group will consist of both men and women. The steering group will play an important role in ensuring that all DERO members are able to contribute to the process of the sector reviews throughout the period of consultation.

Timeframe

It is anticipated that the evaluation will last 4 weeks, with 3 days in Nyala offices, up to 2 weeks of field visits, and 1 week of writing up the report, feedback, revisions and dissemination workshop. 2 additional days will be allocated for unforeseen delays in the process.

It is planned that the evaluation will commence during May 2007.

Process

- Initial meetings in Nyala to review background information to inform the assignment and to review proposed methodology
- Write-up methodology and timeline
- Desk-based review of key documents
- Stakeholder meeting in Nyala
- Identify programme areas/partners to visit
- Field visit – interviews/ focus group discussion with stakeholders: beneficiaries, NGOs, local government, and relevant co-ordination networks
- Presentation of preliminary findings to partners
- Produce draft evaluation document
- Presentation of draft report to DERO
- Incorporation of comments received and preparation of the final report
- Half-day workshop to present final findings

7. The report

The evaluation report should consist of:

- Executive summary and recommendations (not more than five pages) All data should be gender disaggregated data and the recommendations should show the impact upon and the participation of women and men.
- Commentary and analysis addressing the issues raised in the TOR in particular: analysis of the capacity (organisational and technical) of all DERO members in the three sectors, phasing-out and hand-over plan, timeframe and indicators, and capacity development inputs. Capacity development inputs should include both technical as well as training of standards and should be gender specific also when it comes to strategies and issues of participation in the training.
- Conclusions and Recommendations with a section dedicated to drawing out specific lessons with suggestions for taking forward lessons learned (not more than 50 pages in all), with reference to specific locations and partners and humanitarian standards including 1325 and CEDAW.
- Evidence for the beneficiary (right holders study and the effects upon women and men. Study)(I think we should avoid beneficiaries and go over to right holders. I do not really understand what is meant here.)

- Appendices, to include evaluation terms of reference, maps, sample framework, beneficiary (right holders) research and bibliography.
- The report and all background documentation will be the property of DERO (as the contracting organisation) and will be disseminated and publicised as appropriate by DERO.

The consultant will submit a draft report for comments to generate feedback, which should be incorporated to produce a final sector review report. The consultant is required to submit 2 hard-copies and an electronic copy of the final sector review report before the deadline agreed.

8. Key person specification

It is anticipated that the evaluation will be conducted by one individual who will have the following experience and skills:

- Relevant experience of evaluating humanitarian aid programmes, especially focused on WatSan, Health and Nutrition sectors
- An understanding of organisational development, capacity development/assessment and strategic planning, including exit strategies
- Relevant experience of working in humanitarian relief and development
- Ability to analyse and synthesise in writing relevant information relating to humanitarian situations
- Ability to work respectfully with national NGO partners and stakeholders

Desirable:

- Knowledge of the structure and function of Government of Sudan ministries in the relevant sectors (WES, MoH)

9. Key reference documents

- Strategic plan for NCA-ACT/Caritas and national partners in Darfur 2007-10
- DERO Appeal for 2007
- Meetings / DERO board, National Coordination Group meeting minutes
- Completed capacity self-assessment reports,
- Sector monthly and quarterly reports – qualitative and quantitative
- Monitoring trip reports

14 APPENDIX B. KEY RECOMMENDATIONS OF BROMWICH ET AL. (2007)**Recommendations – Water resource management****RECOMMENDATION 3.1**

The water sector should adopt sustainable resource management as the framework for water supply in the humanitarian context, in order to ensure that water security is not undermined by inappropriate abstraction. UNICEF, FAO, UNEP and NGOs should collaborate to ensure that this framework is adopted throughout the Darfur humanitarian programme.

RECOMMENDATION 3.2

Groundwater levels should be monitored by organisations managing groundwater abstraction. As an indicative and realistic target at least one in five production wells (with mechanical pumps) should be monitored. This is as required by the UN 2007 Work Plan for Sudan.

PRIORITY: Groundwater monitoring loggers should be installed at Abu Shouq, Kalma, Mornei, Kass, Kutum and Gereda.

RECOMMENDATION 3.3

Water resource assessments should be undertaken as a matter of urgency at the El Fasher camps and other vulnerable centres of demand.

PRIORITY: A review of water resource security should be undertaken at camps in El Fasher, Kalma, Mornei, and Kass.

RECOMMENDATION 3.4

Water resource technical information centres should be set up in each state to support the quality of the technical interventions in Darfur. In line with this a greater emphasis should be put on providing qualified hydrogeological staff in the field to ensure the quality of the water supply programme.

15 APPENDIX C. SPHERE KEY INDICATORS IN THE WATSAN SECTOR

Hygiene promotion standard 1: All facilities and resources provided reflect the vulnerabilities, needs and preferences of the affected population. Users are involved in the management and maintenance of hygiene facilities where appropriate.

Key indicators

- Key hygiene risks of public health importance are identified.
- Programmes include an effective mechanism for representative and participatory input from all users, including in the initial design of facilities.
- All groups within the population have equitable access to the resources or facilities needed to continue or achieve the hygiene practices that are promoted.
- Hygiene promotion messages and activities address key behaviours and misconceptions and are targeted for all user groups. Representatives from these groups participate in planning, training, implementation, monitoring and evaluation.
- Users take responsibility for the management and maintenance of facilities as appropriate, and different groups contribute equitably.

Water supply standard 1: access and water quantity. All people have safe and equitable access to a sufficient quantity of water for drinking, cooking and personal and domestic hygiene. Public water points are sufficiently close to households to enable use of the minimum water requirement.

Key indicators

- Average water use for drinking, cooking and personal hygiene in any household is at least 15 litres per person per day.
- The maximum distance from any household to the nearest water point is 500 metres.
- Queuing time at a water source is no more than 15 minutes.
- It takes no more than three minutes to fill a 20-litre container.
- Water sources and systems are maintained such that appropriate quantities of water are available consistently or on a regular basis.

Guidelines for users per water point... Assumes source open 8 hours/day

250 people per tap	based on flow of 7.5 l/min
500 people per hand-pump	based on flow of 16.6 l/min
400 people per single user open well	based on flow of 12.5 l/min

Water supply standard 2: water quality. Water is palatable, and of sufficient quality to be drunk and used for personal and domestic hygiene without causing significant risk to health.

Key indicators

- A sanitary survey indicates a low risk of faecal contamination.
- There are no faecal coliforms per 100ml at the point of delivery.
- People drink water from a protected or treated source in preference to other readily available water sources.
- Steps are taken to minimise post-delivery contamination.
- For piped water supplies, or for all water supplies at times of risk or presence of diarrhoea epidemic, water is treated with a disinfectant so that there is a free chlorine residual at the tap of 0.5mg per litre and turbidity is below 5 NTU.

- No negative health effect is detected due to short-term use of water contaminated by chemical (including carry-over of treatment chemicals) or radiological sources, and assessment shows no significant probability of such an effect.

Water supply standard 3: water use facilities and goods. People have adequate facilities and supplies to collect, store and use sufficient quantities of water for drinking, cooking and personal hygiene, and to ensure that drinking water remains safe until it is consumed.

Key indicators

- Each household has at least two clean water collecting containers of 10-20 litres, plus enough clean water storage containers to ensure there is always water in the household.
- Water collection and storage containers have narrow necks and/or covers, or other safe means of storage, drawing and handling, and are demonstrably used.
- There is at least 250g of soap available for personal hygiene per person per month.
- Where communal bathing facilities are necessary, there are sufficient bathing cubicles available, with separate cubicles for males and females, and they are used appropriately and equitably.
- Where communal laundry facilities are necessary, there is at least one washing basin per 100 people, and private laundering areas are available for women to wash and dry undergarments and sanitary cloths.
- The participation of all vulnerable groups is actively encouraged in the siting and construction of bathing facilities and/or the production and distribution of soap, and/or the use and promotion of suitable alternatives.

Excreta disposal standard 1: access to, and numbers of, toilets. People have adequate numbers of toilets, sufficiently close to their dwellings, to allow them rapid, safe and acceptable access at all times of the day and night.

Key indicators

- A maximum of 20 people use each toilet.
- Use of toilets is arranged by household(s) and/or segregated by sex.
- Separate toilets for women and men are available in public places (markets, distribution centres, health centres, etc.)
- Shared or public toilets are cleaned and maintained in such a way that they are used by all intended users.
- Toilets are no more than 50 metres from dwellings.
- Toilets are used in the most hygienic way and children's faeces are disposed of immediately and hygienically.

Excreta disposal standard 2: design, construction and use of toilets. Toilets are sited, designed, constructed and maintained in such a way as to be comfortable, hygienic and safe to use.

Key indicators

- Users (especially women) have been consulted and approve of the siting and design of the toilet (see guidance notes 1-3).
- Toilets are designed, built and located to have the following features: (paraphrased by the author)
 - Equitable accessibility
 - Minimising safety risks
 - Easy to keep clean
 - Acceptable privacy
 - With consideration for women's sanitary needs
 - Minimise insect breeding

- All toilets constructed that use water for flushing and/or a hygienic seal have an adequate and regular supply of water
- Pit latrines and soakaways (for most soils) are at least 30 metres from any groundwater source and the bottom of any latrine is at least 1.5 metres above the water table. Drainage or spillage from defecation systems must not run towards any surface water source or shallow groundwater source.
- People wash their hands after defecation and before eating and food preparation.
- People are provided with tools and materials for constructing, maintaining and cleaning their own toilets if appropriate.

Vector control standard 1: individual and family protection. All disaster-affected people have the knowledge and the means to protect themselves from disease and nuisance vectors that are likely to represent a significant risk to health or well-being.

Key indicators

- All populations at risk from vector-borne disease understand the modes of transmission and possible methods of prevention
- All populations have access to shelters that do not harbour or encourage the growth of vector populations and are protected by appropriate vector control measures.
- People avoid exposure to mosquitoes during peak biting times by using all non-harmful means available to them. Special attention is paid to protection of high-risk groups such as pregnant and feeding mothers, babies, infants, older people and the sick
- People with treated mosquito nets use them effectively;
- Control of human body lice is carried out where louse-borne typhus or relapsing fever is a threat;
- Bedding and clothing are aired and washed regularly
- Food is protected at all times from contamination by vectors such as flies, insects and rodents.

Vector control standard 2: physical, environmental and chemical protection measures. The numbers of disease vectors that pose a risk to people's health and nuisance vectors that pose a risk to people's well-being are kept to an acceptable level.

Key indicators

- Displaced populations are settled in locations that minimise their exposure to mosquitoes.
- Vector breeding and resting sites are modified where practicable.
- Intensive fly control is carried out in high-density settlements when there is a risk or the presence of a diarrhoea epidemic.
- The population density of mosquitoes is kept low enough to avoid the risk of excessive transmission levels and infection
- People infected with malaria are diagnosed early and receive treatment.

Vector control standard 3: chemical control safety. Chemical vector control measures are carried out in a manner that ensures that staff, the people affected by the disaster and the local environment are adequately protected, and avoids creating resistance to the substances used.

Key indicators

- Personnel are protected by the provision of training, protective clothing, use of bathing facilities, supervision and a restriction on the number of hours spent handling chemicals.
- The choice, quality, transport and storage of chemicals used for vector control, the application equipment and the disposal of the substances follow international norms, and can be accounted for at all times.

- Communities are informed about the potential risks of the substances used in chemical vector control and about the schedule for application. They are protected during and after the application of poisons or pesticides, according to internationally agreed procedures.

Solid waste management standard 1: collection and disposal. People have an environment that is acceptably uncontaminated by solid waste, including medical waste, and have the means to dispose of their domestic waste conveniently and effectively.

Key indicators

- People from the affected population are involved in the design and implementation of the solid waste programme.
- Household waste is put in containers daily for regular collection, burnt or buried in a specified refuse pit.
- All households have access to a refuse container and/or are no more than 100 metres from a communal refuse pit.
- At least one 100-litre refuse container is available per 10 families, where domestic refuse is not buried on-site.
- Refuse is removed from the settlement before it becomes a nuisance or a health risk
- Medical wastes are separated and disposed of separately and there is a correctly designed, constructed and operated pit, or incinerator with a deep ash pit, within the boundaries of each health facility
- There are no contaminated or dangerous medical wastes (needles, glass, dressings, drugs, etc.) at any time in living areas or public spaces
- There are clearly marked and appropriately fenced refuse pits, bins or specified areas at public places, such as markets and slaughtering areas, with a regular collection system in place
- Final disposal of solid waste is carried out in such a place and in such a way as to avoid creating health and environmental problems for the local and affected populations.

Drainage standard 1: drainage works. People have an environment in which the health and other risks posed by water erosion and standing water, including stormwater, floodwater, domestic wastewater and wastewater from medical facilities, are minimised.

Key indicators

- Areas around dwellings and water points are kept free of standing wastewater, and stormwater drains are kept clear
- Shelters, paths and water and sanitation facilities are not flooded or eroded by water
- Water point drainage is well planned, built and maintained. This includes drainage from washing and bathing areas as well as water collection points
- Drainage waters do not pollute existing surface or groundwater sources or cause erosion
- Sufficient numbers of appropriate tools are provided for small drainage works and maintenance where necessary

16 APPENDIX D. LOG OF MEETINGS/VISITS DURING STUDY PERIOD

Date		
11/9/07	Arrival in Khartoum	
12/9/07	In DERO Khartoum acquiring permissions/tickets Meeting with John Birchenough (ACT/Caritas Donor Liaison Officer, Khartoum)	
13/9/07	Travel to Nyala	
14/9/07	Discussion with Tommy Bouchibi (ACT/Caritas Logistics manager, Nyala)	
15/9/07	Discussions with ACT/Caritas Staff: Matthew Mpitapita; Wilfred Kibwote; John Distefano	
16/9/07	Meeting with SUDO, Nyala: Abboud Abudafair (Coordinator for Nyala office) Suliman Ahmed (Water and Sanitation Engineer)	
16/9/07	Meeting with WES, Nyala Gafar Ahmed, Assistant to director	
17/9/07	Discussions with ACT/Caritas Staff: Matthew Mpitapita; Simon Visit to SUDO at Mershing Camp Suliman Ahmed (Water and Sanitation Engineer, SUDO, Nyala) Abdurahman Hussein, SUDO Pharmacist, Mershing Muhamed Abdullahmustafa, SUDO Medical Asst., Mershing Abdulazim Ibrahim Adam, Member of SUDO Mershing WatSan committee.	
18/9/07	Meeting with UNICEF, South Darfur (Nyala) Moataz Abd Elgadeir, ACT/Caritas Project Assistant Watsan, Nyala Suliman Arabi, WatSan officer, UNICEF Anil Dutt, Watsan Project Officer, UNICEF	sarabi@unicef.org
18/9/07	Meeting with Ministry of Health, South Darfur Moataz Abd Elgadeir, ACT/Caritas Project Assistant Watsan, Nyala Yahia Adam, Director, Environmental Health and Water, MoH	
18/9/07	Meeting with SUDO Ahamed Satti (Head of Water and Sanitation, SUDO, Khartoum) Suliman Ahmed (Water and Sanitation Engineer, SUDO, Nyala)	sattamins@hotmail.com 09-24681485
18/9/07	Meeting with UN OCHA Stacey Bellou (Field Coordinator, OCHA)	Stacey.ballou@undp.org 09-12166295
19/9/07	Travel by helicopter to Zalingei with Matthew Mpitapita Meeting with Mr Babiker Ibrahim, ACT/Caritas WatSan technician Meeting with Mr Adam and 4 staff of ACT/Caritas hygiene promotion unit	azark2@yahoo.com
19/9/07	Meeting with Mr Issam Adam Abduljabar, Head of SUDO, Zalingei	Issam22871@yahoo.com
19/9/07	Field visit to ACT/Caritas borehole in Zalingei town and Abu Bakr school	
19/9/07	Meeting with Saudalla Ahmed Sardulla, WES, Zalingei	
20/9/07	Field visits with Babiker Ibrahim to Khamsa Degaig, Taiba and Hammidiya camps, Zalingie	
21/9/07	Travel by road from Zalingei to Deleig Discussions with George Wambugu (ACT Caritas) and Mike Barton (TEAR Fund area coordinator)	
22/9/07	Field visit to Deleig camp with George Wambugu Meeting with Sheikh of Sheikhs (Jakob) in Deleig camp	
23/9/07	Field visit to Mindo and Daba (Garsila) IDP camps with Adam Juma (ACT/Caritas)	

	Field meetings with Issa Yahir (Chairman of Daba camp water committee) Ibrahim Abdulkarim, Sheikh of Sheikhs, Daba Camp Ms Darnaim Adam, ACT/Caritas Community mobiliser, Jabaleen camp	
23/9/07	Meeting with Mohamed Ahamed (WES, Garsila)	
23/9/07	NGO Coordination meeting with representatives from ACTED, IMC, ACT/Caritas, InterSOS and TEAR Fund in Garsila	
24/9/07	Aborted departure from Garsila to Nyala	
25/9/07	Departure from Garsila to Nyala.	
26/9/07	Reporting in Nyala. Debriefing meeting with Ahamed Satti (SUDO head of WatSan), Ismail Algazouli (SUDO's DERO coordinator) and Paul Gichuhi (WatSan Sector Manager, ACT/Caritas)	ismailalgazouli@yahoo.com
27/9/07	Reporting in Nyala.	
28/9/07	Travel Nyala/Khartoum	
29/9/07	Debriefing meeting with John Distefano, Ahmed Mukhtar Gamal Eldin (Executive Director, SUDO), Ahmed Satti, Kari Øyen (NCA) and John Borton (Consultant to ACT/Caritas)	ahmed@sudosudan.org johnborton@ntlworld.com
29/9/07	Meeting with Brendan Bromwich (UNEP)	brendan.bromwich@unep.ch
29/9/07	Departure for Manchester	